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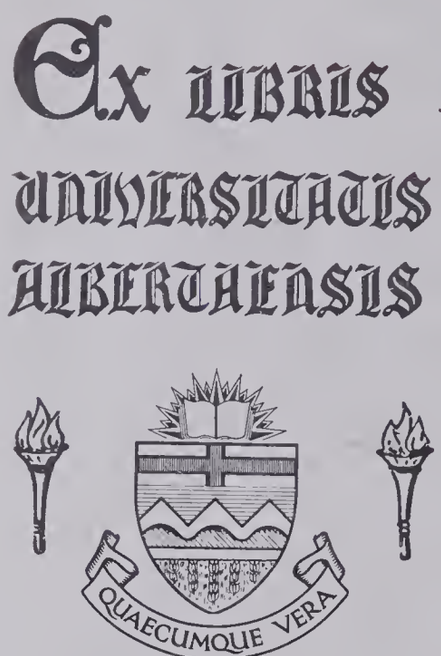

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ADMINISTRATIVE RATIO AND THRESHOLD SIZES OF ADMINISTRATIVE OFFICES IN ALBERTA SCHOOL SYSTEMS

by

© KURUVILLA AARON VITHAYATHIL

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN

PARTIAL FULFILMENT OF THE REQUIREMENTS FOR

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FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Administrative Ratio and Threshold Sizes of Administrative Offices in Alberta School Systems" submitted by Kuruvilla Aaron Vithayathil in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

The purposes of this study were to investigate (1) the change in administrative ratio in school systems in relation to increase in the size of the systems, and (2) the relationship of the appearance of new administrative offices to system size.

The sample consisted of 108 school systems in Alberta. Pertinent data from the school systems were collected by means of questionnaires.

Four definitions of administrative component and three definitions of system size were used, which gave twelve definitions of administrative ratio. Correlations between each administrative ratio and the corresponding system size were obtained and tested for significanace. Mean administrative ratios in groups of very small, small, medium and large systems of the sample were computed. A one-predictor model of multiple regression analysis, with administrative ratio as criterion and employee size as predictor was applied to the data. Further, a three-predictor model of multiple regression analysis with administrative ratio as criterion and three size variables, employee size, student size and location size, as three predictors, was applied to the data.

The study found that the administrative ratios in school systems decreased as system size increased. However, in the three-predictor model of multiple regression analysis, when influences of changes in student size and location size were controlled for, an increase in

employee size gave an increase in administrative ratio; when the influences of changes in employee size and location size were controlled for, an increase in student size gave a decrease in administrative ratio. The finding about location size in this respect was inconclusive.

The difference in the definition of administrative ratio did not seem to affect the relationship between administrative ratio and system size.

Threshold sizes of only a few administrative offices could be estimated from the sample. This evidence was not considered sufficient to establish the existence of a relationship between the appearance of new administrative offices and system size.

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS

Introduction

Antony Jay writes of modern large scale organizations, "The old problems of making well and selling well become insignificant compared with the ghastly new problem of managing well." (10:14). A remarkable feature of the development of organizations in our day is their growth in size, and the administrative component of an organization is perhaps the part most affected by the organization's growth in size. It has been pointed out repeatedly, for example by Blau and Scott (1:7), and by Gill and Friesen (5:1), that as groups grow larger, administration becomes more explicit, and as organizations increase in size, their administrative apparatus become more elaborate. Hence questions arise about the nature and characteristics of the growth of the administrative component of an organization as organizational size increases.

The process leading to change in the size of the administrative component brought about by an increase in the organizational size is fairly complex. It can be gathered from Entwistle and Walton (3:22-23), and Indik (9:7) and others, that as groups grow larger, intragroup relationships multiply, and complexity of tasks increases, necessitating increased supervision. However, others, like Litterer (11:409), point out that the growth of an organization effects changes in the form of administration, increasing the latter's efficiency and thus

tending to decrease the relative size of the managerial hierarchy.

All these comments seem to apply to school systems. Like other modern organizations, school systems have registered a marked tendency to grow in size and in complexity of services. As they grow, the volume of managerial work increases, and the form of administrative structure changes. This leads to questions about the nature of the growth of the administrative component in school systems.

I. THE PROBLEM

Statement of the Problem

The purpose of the present study was to examine the change in the size of the administrative components of school systems in relation to increase in the size of the systems. Information related to the following questions was sought. Does the ratio of the size of the administrative component to the total size of the school system change as school systems increase in size? If it does, in what direction does the ratio change? Further, how does the size of the administrative component change? In other words, does the appearance of new administrative offices keep a consistent relation to total size in different school systems, making it feasible to estimate threshold sizes of school system for the appearance of different administrative offices?

Importance of the Study

Writers and researchers agree that growth of the administrative

component in relation to growth in organizational size is an area which needs further empirical investigation. Haas, Hall and Johnson observe that this area has been "the subject of considerable speculation but rather small amount of actual investigation." (7:10). Starbuck found that the available evidence in this area was too sketchy to allow the drawing of sensible conclusions (13:509). The only studies that examined this problem on samples of school systems are one by Terrien and Mills (14), and another by Gill (4). Terrien and Mills studied all the school systems in California, while Gill examined a sample of thirty-eight urban school systems in western Canada. It may be noted that the conclusions reached were conflicting. Hence there seems to be ample scope for further studies to examine this problem.

Further, this study was intended to supplement that already done by Gill, and also another related study currently undertaken by Blowers at the University of Alberta. The three studies combined may provide comprehensive information about the particular problems investigated, especially with respect to western Canada.

The present study may have implications for the organization of school systems, especially in Alberta. The findings of this study may bring additional information regarding organizations in general. For example, in a limited way, it may throw light on the managerial advantages of scale.

II. PERTINENT DEFINITIONS

Administrative Component

Proper definition of the administrative component of a school system is essential. Haas, et al. remark that ambiguity of terms like "administrative personnel" is one of the reasons for discrepancies among the findings of the several studies in this area (7:11). Each researcher has a certain degree of freedom and discretion in developing his own definition, but uniform definition and procedures will facilitate comparison of findings.

Basic agreement seems to exist among authors in the description of administrative tasks. Sears has distinguished five different kinds of activities in the administrative process, namely, planning, organizing, directing, co-ordinating, and controlling (12:31). Griffiths divides the administrative jobs in a school system into four general areas:

1. Improving educational opportunity;
2. Obtaining and developing personnel;
3. Maintaining effective relations with community; and
4. Providing and maintaining funds and facilities. (6:154)

This division by Griffiths covers basically the same jobs as the classifications by Harris (8:13-14), and by Campbell, et al. (2:96).

Researchers differ in their definition of the administrative component in organizations. Haas, et al. derived the criterion of direct versus indirect contribution to the attainment of organizational goals, in order to dichotomize total organization personnel into "direct" versus "supportive" categories. But they held

supportive activity to be wider than administrative activity (7:12). Harris has employed the criterion of direct/indirect relation to pupils and to instruction to distinguish nonadministrative staff from administrative staff in schools (8:12). Indik adopted a very narrow definition of administrative staff when he counted only key decision makers and direct supervisors as constituting the same (9: 311). Most other researchers have adopted a definition of administrative component falling between the definitions of Haas, et al. and Indik.

Gill accepted the categorization of administrative tasks by Campbell et al. He also adopted in principle the criterion of indirect relation to pupils to distinguish administrative staff from professional staff whose work brought them into direct relationship to pupils. Applying these norms, he defined administrative staff in school systems as those undertaking the following tasks:

1. Planning, organizing, directing co-ordinating and/or controlling the activities and personnel of the school system;
2. The making of key organizational decisions; and
3. The supervision of the work of other personnel.

(4:5-10)

In the present study, in agreement with Gill, the personnel at the central office and in schools who met these criteria were categorized as administrative staff.

Gill justifiably excluded from the administrative component those personnel on the central office staff, like guidance officers, visiting or special teachers, who were concerned with the extension

of the instructional program; he included subject co-ordinators and business managers among administrative staff. For certain circumstantial and theoretical reasons Gill did not count vice-principals as administrative staff. However, many vice-principals may meet the above norms.

Gill excluded clerical staff from the administrative component. It may be reasonable not to count clerical and secretarial staff as administrators. But there is justification for including them in the administrative component. Starbuck, for example, distinguishes "managers" and "other administrative employees," but he groups the latter--"secretaries, file clerks and telephone operators"--with their "bosses." The reason for this aggregation, according to him, is that the activities of the managerial and nonmanagerial administrative employees are highly substitutable. The manager of a small organization spends considerable time on administrative activities which would be performed by nonmanagerial employees in a large organization (13:511). Litterer specifically includes "clerks, secretaries etc." who help line and staff managers, among managerial personnel (11:409).

The foregoing discussion would suggest it advisable to consider more than one definition of the administrative component. Besides increasing the comprehensiveness of the investigation, this procedure would facilitate close comparison of the findings of the study with those of other studies in the area.

For the purposes of the present study, therefore, four definitions of administrative component were adopted.

I. Central office administrative staff, namely, those persons employed in administrative tasks, as defined above, at the central office of the school system.

II. The central office administrative staff, as above, plus the principals of schools in the system.

III. The central office administrative staff plus principals plus vice-principals of schools in the system.

IV. The central office administrative staff, principals, vice-principals and the clerical and secretarial staff who help these officers in the system.

However, it was found practically difficult to separate accurately the number of clerical and secretarial staff who helped at administrative tasks from the number of such staff who helped at nonadministrative tasks. Therefore a definition of the administrative component including clerical and secretarial staff had to be abandoned. Thus the study was left with three definitions of the administrative component. In the following sections of the study these three definitions are referred to as administrative component I, II and III, in the order given above.

An examination of the relationship between the number of the total staff--administrative and professional--employed at the central office of the school system and the size of the system was considered useful for the completeness of the investigation undertaken in this

study. Although this component cannot be called administrative in the strict sense of the term, for the sake of convenience it will be referred to as administrative component IV in the following sections of the study.

Size of School System

Gill obtained the size of the school system by adding together the numbers of the following categories of personnel employed in the system:

(a) All certificated personnel, including principals, employed as members of the school staffs;
(b) all personnel identified as administrative staff, and employed directly from or by the central office of the school system; and
(c) all personnel who are employed from or by the central office in professional tasks, but who are not categorized as administrative staff.

(4:10-11)

Terrien and Mills, in their study of administrative ratio in California school systems, counted "teachers, nurses, custodians, cafeteria workers and the like" as forming the nonadministrative component (14:12).

In the present study, departments like cafeteria and transportation did not seem to be essentially part of school systems. Clerical and other support staff, in principle, formed part of the employees of school systems; however, since, for practical reasons, clerical and other support staff were not included in the computation of administrative component, it was decided not to include clerical and other support staff in the computation of the size of systems.

Besides the number of employees, two other variables offered meaningful definitions of the size of school system. These were the number of students in the school system, and the number of schools in the system. The number of students in a school system was a measure of the service performed by the system; the number of schools in a system represented the number of locations at which the services of the system were performed. These two factors, viz, the volume of service and the number of locations at which the service was performed, seemed likely to affect the administrative ratio in school systems.

Therefore three definitions of system size were adopted for the purposes of the present study.

I. The total number of administrative and professional personnel, those personnel included in the three categories of Gill as cited above, in the system.

II. The total number of students in the system.

III. The total number of schools in the system.

These three definitions of the size of school system will be referred to in this report as the employee size, the student size, and the location size of the system, indicating the particular size variable used to form the definition.

Administrative Ratio

Administrative ratio was defined as the ratio of the size of administrative component to the size of school system, and was obtained

by dividing the number representing the administrative component by the number representing the size of the system.

The adoption of different definitions for administrative component and for system size made it logical to consider the following administrative ratios.

I. The ratio of administrative component I to the employee size of the system.

II. The ratio of administrative component I to the student size of the system.

III. The ratio of administrative component I to the location size of the system.

IV. The ratio of administrative component II to the employee size of the system.

V. The ratio of administrative component II to the student size of the system.

VI. The ratio of administrative component II to the location size of the system.

VII. The ratio of administrative component III to the employee size of the system.

VIII. The ratio of administrative component III to the student size of the system.

IX. The ratio of administrative component III to the location size of the system.

X. The ratio of administrative component IV to the employee size of the system.

XI. The ratio of administrative component IV to the student size of the system.

XII. The ratio of administrative component IV to the location size of the system.

Consistent Occurrence of an Administrative Office

The offices of the Superintendent and Secretary-Treasurer are the basic offices at the central office of school systems in Alberta. The presence of other offices, say, supervisors and directors of branches, are largely dependent on the size of the system. Gill (4:54-55) adopted the convention of referring to systems by their employee size: i.e., a system having an employee size of 60 was referred to as system 60. According to Gill, the first additions to the central office administrative staff were Library Officer, Director of Elementary Education, Assistant Secretary-Treasurer, Subject Supervisor, Assistant Superintendent and Subject Consultant. These offices appeared rather sporadically in systems 68 to 89. For example, the Director of Elementary Education found in system 68 was not present in the other systems. The Subject Supervisor appeared only in system 75, and the Assistant Superintendent was not present in any of these systems except 83. But the Subject Supervisor appearing in system 100 was present in all but two of the twenty-two systems above that size. So also the Director of Elementary Education appeared in twelve out of the nineteen systems from system 128 upwards.

The appearance of an office in most systems above a certain system size showed a certain relationship which could be called consistency of occurrence above that size.

Consistency of occurrence. Consistency of occurrence of an administrative office was defined thus: When school systems are ranked in their order of size, from smallest to largest, an office is said to occur consistently above a certain size of system if it appears in at least 50 per cent of the cases.

Threshold size. The system size at which an administrative office began to occur consistently in the sample was called the threshold size of that office.

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CHAPTER II

REVIEW OF LITERATURE

Litterer states that organizational growth is one of the less developed areas in the study of organizations (7:397). However, organizational growth and development have been a subject of perennial concern for the students of organizations. The points of concern have been many and varied. The concern here is the change in the size of the administrative component in relation to increase in size of the organization.

Speculative Studies

Speculative approaches to this subject may be divided into two opposing lines of thought.

There is the semisatiric thesis of Parkinson that as organizations grow, the ratio of the staff employed in supervision will increase (8:2-13). Caplow, probably, refers to this when he says that "there is an almost universal belief that the administrative and overhead components of any organization increase out of proportion to increases in size." He points out that large groups apparently devote a larger proportion of their resources to their own operation than do small groups. Perhaps the necessities of large scale communication and control require certain types of activities to be performed which are not essential in small groups (2:502).

The opposite line of thought may be gathered from Litterer (7:408-409). There are advantages of scale in the managerial area

as in areas of production and finance. Increased size may be accompanied by a larger span of control for the supervisors. Increased size also permits the managerial hierarchy to take on more efficient forms. Specialization in managerial functions becomes possible permitting the functions to be performed much more efficiently than otherwise. Duplication of efforts can be eliminated or reduced. A large amount of managerial work will enable utilization of the full capacity of administrative personnel employed. In Litterer's words:

> In short, as organization increases in size, the larger managerial group becomes progressively more capable of carrying out its overall responsibility than it was at a smaller size.
> As a result we would expect the number of people involved in carrying out the managerial activities to decrease as a percentage of the total group as a company grew larger. (7:409)

Empirical Studies

Longitudinal studies. A number of studies have been done, relating size of administrative component either to age of the organization or to the increase in organizational size through the years. Haas et al. report that Melman and Bendix in their analysis of industrial firms found increase in the ratio of administrative component to system size accompanying organizational growth. They further report that although Wilensky found that greater use of staff experts was made in multiunit labour unions than in single unit ones, he found practically no relation between age of organization

and growth of staff expert component (4:10). Haire in his historical examination of four manufacturing firms found that after the early years of rapid growth, management size grew at the same rate, if not more slowly, as the total size (5:287-98).

Cross-sectional studies. As the present study is a cross-sectional one, a review of the cross-sectional studies in the field is more relevant to the present context than that of longitudinal studies.

Terrien and Mills (1955) studied the elementary, high, and unified school systens in California. They hypothesized, using Parkinson's idea, that the larger the size of the containing organization, the greater would be the proportion given over to the administrative component. They included "superintendent, his assistants and immediate staff, principals, business managers and the like" in the administrative component. Personnel in the nonadministrative component were "teachers, nurses, custodians, cafeteria workers and the like." Each of the three types of schools were divided into groups of small, medium, and large systems and mean administrative ratios were computed for the three groups. They found that in all the three types of schools the mean administrative ratio rose from small through medium to large systems (9:11-14).

Anderson and Warkov (1961) in their study of Veterans' Hospitals in the U.S.A. found that the administrative ratio decreased as organizational size increased. They had included office work,

supply, and planning personnel in the administrative component. However, they suggested that the administrative ratio might increase as the number of places at which work was performed by the organization increased (1:23-28).

Haas, Hall and Johnson (1963) studied thirty organizations ranging extensively in size and kind. They supplanted "administrative" with "supportive" component, dichotomizing organization personnel into "direct" versus "supportive" categories. The major purpose of the research was "the determination of the relationship between the relative size of the supportive component and other organizational characteristics. . . ." They found the size of the supportive component to be, on the whole, in inverse relation to total size, and the relationship maintained itself over organizational types (4:12-17).

Indik (1965) studied five organizations with different purposes, including business organizations and voluntary ones. He employed a strict definition of administrative personnel by including only key decision makers and direct supervisors in administrative staff. He found that as the size of the organizational unit increased, the ratio of the supervisory personnel to system size decreased. However, Indik suggested:

1. If the complexity of the task of lower level individuals in the system increased as the organizational size increased, the supervisory ratio might increase.
2. The ratio of the total administrative component might increase with organizational size.

(6:301-12)

The study of Tosi and Patt (1967) is more recent. This study examined administrative ratio in thirty-six U. S. Army hospitals. The size criterion was the total number of full-time personnel assigned to the hospital. The administrative component consisted of office work, supply, and planning personnel. The hospitals ranged from 37 to 931 employees. The hypothesis tested was that "the ratio of administrative personnel to total personnel decreased as the size of containing organization increased." The sample was grouped into three groups according to size, and mean ratio of administrative personnel to total size was calculated for each group. The finding was that the administrative ratio was inversely related to total size (10:164-67).

Gill (1967) studied thirty-eight urban school systems in the four western provinces of Canada, in order to examine the change in administrative ratio, and the existence of possible threshold sizes of system for the appearance of different administrative offices.

Gill defined administrative staff as consisting of (a) principals, (b) personnel employed or housed directly in the central office of school systems, excluding, however, clerical staff and special or supplementary teachers. The size of the school system was defined as the total number of professional and administrative personnel--excluding clerical, custodial, and cafeteria staff, and staffs of sections such as store, equipment and maintenance--employed both in the schools and at the central office (3:1-12).

The following table illustrates Gill's findings about the administrative ratio (3:46):

MEAN PERCENTAGES OF ADMINISTRATIVE COMPONENTS IN GROUPS OF SCHOOL SYSTEMS OF DIFFERENT SIZES

Group designation	Number in group	Size range	Administrative component-mean percentage	Standard deviation
Small	18	47-248	10.7	2.3
Medium	12	252-761	8.6	1.2
Large	7	1026-3099	6.7	1.3

This table shows that the larger systems contained a smaller proportion of administrative staff than did the smaller systems.

Gill was also able to find that there was a certain order to the appearance of administrative offices in school systems and that consistent occurrence of several administrative offices appeared to be associated with certain sizes of school system. For example, regular appointment of Subject Supervisors began with system of size 100[1]; twenty out of twenty-two systems of sizes 100 and above had at least one Subject Supervisor. The first line office (after that of the Superintendent) to appear was that of the Director of Elementary Education which showed high consistency at size 128. Consistency of occurrence of an office was defined by Gill as occurrence of the office in at least 50 per cent of the possible cases. The size of system at which an office began to occur

[1]Employee size of 100 (see pp. 10-11).

consistently was called the threshold size for that office. Gill identified threshold sizes for thirty-eight administrative offices (3:53-99). A few samples of threshold sizes (T.S.) identified by Gill are given below.

1st office - elem. education	T.S. 128
1st office - sec. education	T.S. 446
1st office - voc. education	T.S. 1168
1st and 2nd supervisors	T.S. 100
Adult Education Director	T.S. 743
Library Officer	T.S. 275

(3:91)

Summary

From the foregoing review of the empirical studies one point is evident. Despite certain definitional differences from one study to another, a negative relationship between administrative ratio and organizational size is generally supported. It cannot be overlooked, however, that the two studies on school systems disagree in their findings.

The present study was directed toward investigating the problem with special reference to school systems in Alberta.

Hypotheses

Based on the findings of the earlier research, two hypotheses were formulated. Hypothesis I was stated in terms of the general definition of administrative ratio. The twelve different definitions of administrative ratio arrived at in Chapter I were to be considered in testing this hypothesis.

Hypothesis I: The administrative ratio in school systems decreases as the size of the system increases.

Hypothesis II: When school systems are ranked in the order of their sizes, and their administrative staff listed, each administrative office begins to occur consistently at a specific size of school system.

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CHAPTER III

DESCRIPTION OF THE SAMPLE AND RESEARCH PROCEDURES

Description of the Sample

The sample proposed for the study was all the available school systems in the Province of Alberta. A recent list showed 137 school systems in Alberta apparently available for study. These were sufficiently numerous, and ranged from very small to very large sizes.

The proposed sample included five categories of school systems, namely, city school districts, town school districts, rural school districts, school divisions, and county school systems. A brief description of these categories of school systems in Alberta may be useful to understand the sample better. The following information has been compiled from Reeves, Melsness, and Cheal (2:70-74), and the Dominion Bureau of Statistics (1:40-44).

In Alberta, the school district is the basic unit of administration. A district might or might not include a city, town or village. For administrative purposes, a district built around a city, or town is called a city district, or a town district as the case may be, and others are called rural districts.

From the time the Province of Alberta was formally established (1905), each school district was autonomous in the operation of its schools. This situation still prevails with respect to some of the districts; but now almost all rural, and many of the

other districts, have become part of larger organizations, namely, school divisions and counties, to which they have relinquished most of their powers.

A school division is thus an aggregate of designated small school districts each of which maintains a nominal independent identity. Naturally, a school division usually comprises a larger geographical area than single school districts. This does not mean that school divisions are larger in terms of employee, student or location sizes than the independently existing single districts.

The county is a local government unit combining municipal and school administration. The county council took over the powers of the district boards, (and division boards, as the case might be), under it and worked through a school committee. The county comprised a larger geographical area than districts and divisions. However, as was mentioned in the case of school divisions, geographical area does not speak for the size of the school organization.

As far as the administrative apparatus for the operation of schools is concerned, all the different types of school systems mentioned above are quite alike. The board of a school division exercises, with respect to its total area, powers similar to those enjoyed by the board of an autonomous district. Similarly the school committee of a county exercises all the powers and duties of a school board. The administrative staff of all the systems are headed by a superintendent, with officers like secretary-treasurer, directors and supervisors under him.

The foregoing description of the different categories of school systems included in the sample shows that the different types of school systems differ in the circumstances of their formation, in the structure and erection of their elected governing bodies, and in the geographical area they comprise; but they do not substantially differ as far as the administrative apparatus for the operation of schools is concerned.

The 137 school systems approached for information included 19 city districts, 45 town districts, 13 rural districts, 30 school divisions, and 30 counties. Of these 131 responded, including 19 school districts, 43 town districts, 11 rural districts, 29 school divisions, and 29 counties. The systems that responded constituted about 96 per cent of the systems approached. Data from nine systems showed less than ten teachers in the system. These systems were considered too small to be included in the study. Data from fourteen other systems were either incomplete or were received too late to be included in the study. The final sample consisted of 108 school systems, including 19 city districts, 32 town districts, 4 rural districts, 26 school divisions and 27 counties. The final sample constituted about 79 per cent of the systems approached for information.

Subsamples and Overall Sample

The fairly large number and range of sizes of the systems within each type of school system allowed considering these as subsamples

for separate analysis. These subsamples had the advantage of great uniformity of characteristics. Further, all the systems were put together to form one overall sample. This overall group had the advantage of a large number and a very large range of sizes. The employee size of the overall sample, for example, ranged from 12 to 3,519.

The overall group could be called a population as far as the province of Alberta was concerned, for it included practically all the available school systems in the province. However, with respect to school systems in general, the group was a sample, and has been referred to as such in this report.

Assumptions

The validity of the study depended upon the accuracy of information received from the school systems. It was assumed that the instrument which was used to collect the information was sufficiently clear to the officials in the school systems, and that the information they supplied was accurate.

Limitations

The study was a cross-sectional one. The findings do not give a strict growth curve, but represent a state of equilibrium having applicability to growth. A cross-sectional study has certain advantages over a longitudinal one; growth through years may involve variables such as changes in environment; these might affect the structure and size of the administrative component of an organization,

in addition to increase in system size.

The study has dealt only with certain characteristics of the growth of organizations, namely, the change in the administrative ratio and the appearance of new administrative offices in school systems, as size of system increases.

Collection of Data

A questionnaire was prepared requesting the information required on the basis of the definitions adopted in Chapter I. In the case of some of the city school districts, a part of the information required was already available at the Department of Educational Administration, University of Alberta. Therefore a modified form of the questionnaire requesting only the additional information was prepared. These instruments, shown in the Appendix A, were sent to the respective school systems with a letter explaining the purpose of collecting the information as well as the nature of the information requested. A complete check list of the administrative offices could not be provided because of the difference in the nomenclature of administrative offices among the different systems, but the covering letter contained a list of administrative offices by way of illustration. Follow-up letters were sent to those systems which failed to respond to the first request. Letters were employed also to obtain information which was found missing, and to clarify pieces of information which were not sufficiently clear.

Analysis of Data

The sizes of administrative components and the total sizes of school systems were calculated according to the definitions adopted in Chapter I. Using these variables, the twelve administrative ratios defined in Chapter I were computed.

The overall sample was broken down into subgroups according to sizes, and the means and standard deviations of administrative ratios in groups of very small, small, medium and large sized systems were computed.

Correlations between administrative ratios and system size were computed and tested for significance.

Multiple regression analysis was applied to the data, with administrative ratio as the criterion and system size(s) as the predictor(s). In a one-predictor regression model, employee size was used as the predictor. In a three-predictor model, employee size, student size, and location size were used as the three predictors.

A frequency count was made of some of the central office administrative offices in order to find the threshold sizes of these offices. The frequency of occurrence of the different administrative offices in the sample were represented graphically.

REFERENCES FOR CHAPTER III

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CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The data on the sample and their analysis for testing hypothesis I are presented in this chapter. Since the data and the analysis were of statistical nature, a number of tables have been used to present the same. Some of these tables which show details like the computation of administrative components and administrative ratios are presented in the Appendix B.

I. PRESENTATION OF THE DATA

Table I - V show the number of schools, the numbers of different categories of administrative and professional employees, and the number of students in the five types of school systems in the sample. The total number of administrative and professional employees in each system (employee size) also is shown on these tables.

The group of city districts consisted of nineteen school systems including the four largest systems in the sample. This group also showed the widest range of system size. The employee size ranged from 14 to 3,519; the student size ranged from 198 to 72,344; and the location size from 1 to 181. The four largest systems stood apart from others in the matter of size. For example, while the employee sizes of these four systems ranged from 944 to 3,519, the employee size of the next largest system in the group

TABLE I

THE NUMBER OF ADMINISTRATIVE AND PROFESSIONAL EMPLOYEES, THE NUMBER OF STUDENTS AND THE NUMBER OF SCHOOLS IN CITY SCHOOL DISTRICTS

System identification number*	Total number of schools	Central office administrative staff	Central office professional staff	Principals	Vice-principals	Teachers	Total admin. and prof. employees	Total students
101	137	96	34	135	153	3,084	3,502	71,827
102	181	134	45	157	231	2,952	3,519	72,344
103	15	11	1	15	18	306	351	7,385
104	15	10	2	15	16	263	306	5,416
105	18	12	3	18	16	274	333	6,120
106	4	6	0	4	2	73	85	1,550
107	5	3	0	5	3	77	88	1,706
108	8	2	1	3	9	103	118	2,195
109	7	3	0	7	7	133	150	2,680
110	52	36	14	52	38	804	944	18,931
111	72	34	6	72	71	1,283	1,464	29,273
112	6	5	0	6	7	87	105	2,148
113	1	1	0	1	1	11	14	198
114	6	2	0	6	3	45	56	1,302
115	7	5	0	7	4	72	88	1,691
116	1	1	0	1	1	12	15	292
117	4	3	0	4	2	43	52	865
118	2	3	0	2	1	23	29	510
119	2	1	0	2	1	19	23	350

*In the system identification number, in this and all the following tables, the first digit represents the type of school system--1=city districts, 2=town districts, 3=rural districts, 4-school divisions, and 5=county school systems; the next two digits represent the number of the system within the respective type.

TABLE II

THE NUMBER OF ADMINISTRATIVE AND PROFESSIONAL EMPLOYEES, THE NUMBER OF STUDENTS, AND THE NUMBER OF SCHOOLS IN TOWN SCHOOL DISTRICTS

System identification number	Total number of schools	Central office administrative staff	Central office professional staff	Principals	Vice-principals	Teachers	Total admin. and prof. employees	Total students
201	2	2	1	2	1	28	34	497
202	2	2	0	2	2	26	32	558
203	2	2	0	2	2	24	30	554
204	3	2	1	3	3	47	56	944
205	3	2	0	1	1	27	31	598
206	1	1	0	1	1	14	17	250
207	3	1	0	3	3	49	56	933
208	1	1	0	1	1	26	29	575
209	2	1	0	1	2	13	17	242
210	1	1	0	1	2	26	30	515
211	1	2	0	1	0	11	14	216
212	1	1	0	1	2	13	17	250
213	2	1	0	2	2	27	32	563
214	1	1	0	1	2	19	23	396
215	2	1	0	1	1	11	14	184
216	2	1	0	2	1	20	24	427
217	2	1	1	2	1	29	33	538
218	1	1	0	1	1	19	22	435
219	1	1	0	1	1	13	16	299
220	1	1	0	1	1	15	18	270
221	1	1	0	1	0	10	12	198
222	1	2	0	1	1	13	17	250
223	1	3	0	1	2	21	27	415
224	1	1	0	1	1	14	17	238
225	1	1	0	1	1	11	14	237
226	1	1	0	1	1	17	20	338
227	1	1	0	1	1	13	16	282
228	1	2	0	1	1	14	18	272
229	1	2	0	1	1	16	20	336
230	3	3	1	3	4	67	77	1,267
231	4	3	5	4	5	75	87	1,530
232	5	5	0	5	5	124	139	2,150

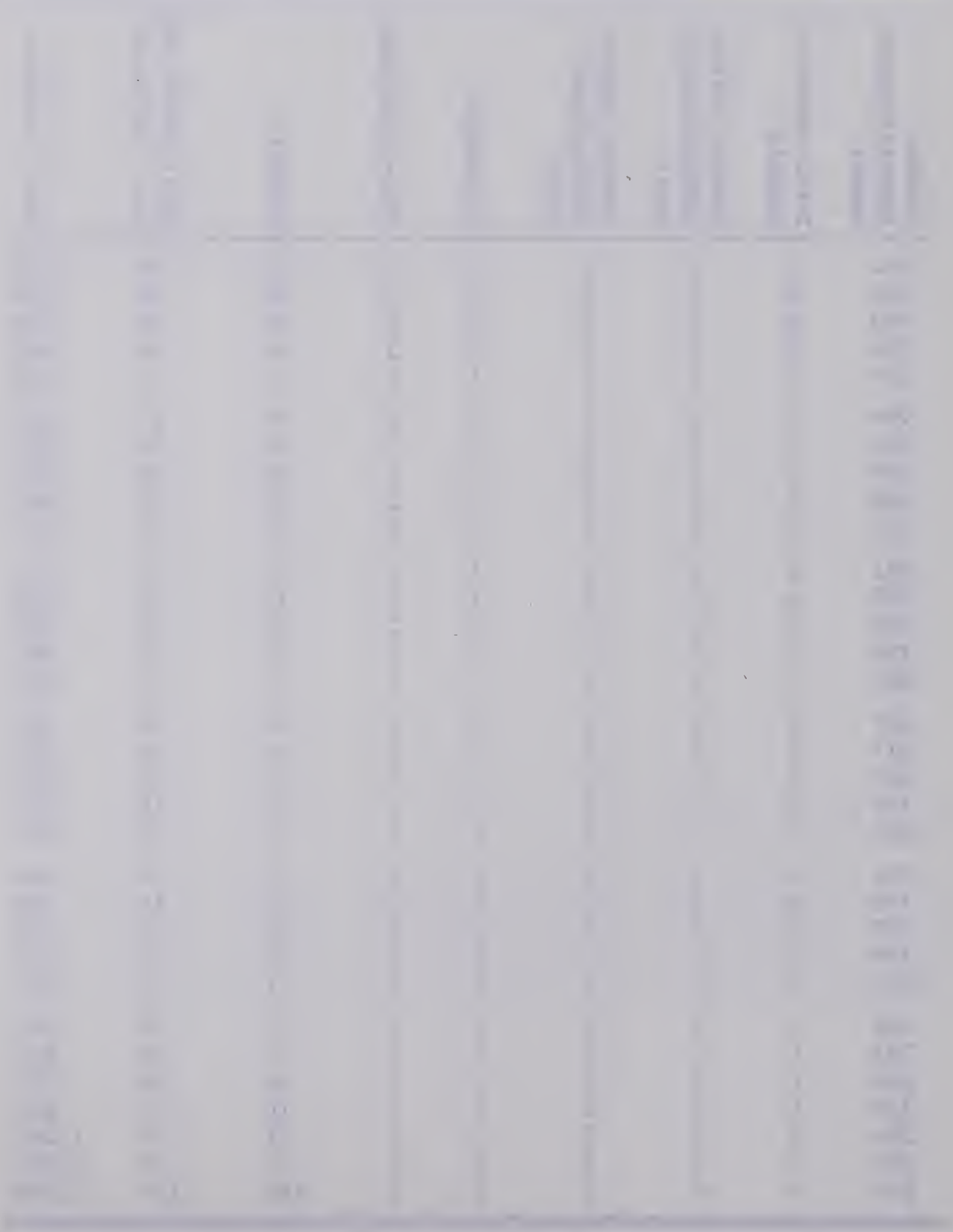

TABLE III

THE NUMBER OF ADMINISTRATIVE AND PROFESSIONAL EMPLOYEES, THE NUMBER OF STUDENTS, AND THE NUMBER OF SCHOOLS IN RURAL SCHOOL DISTRICTS

System identification number	Total number of schools	Central office administrative staff	Central office professional staff	Principals	Vice-principals	Teachers	Total admin. and prof. employees	Total students
301	2	1	0	2	2	31	36	687
302	1	2	0	1	2	10	15	215
303	2	1	0	2	2	36	41	694
304	2	1	0	2	2	33	38	691

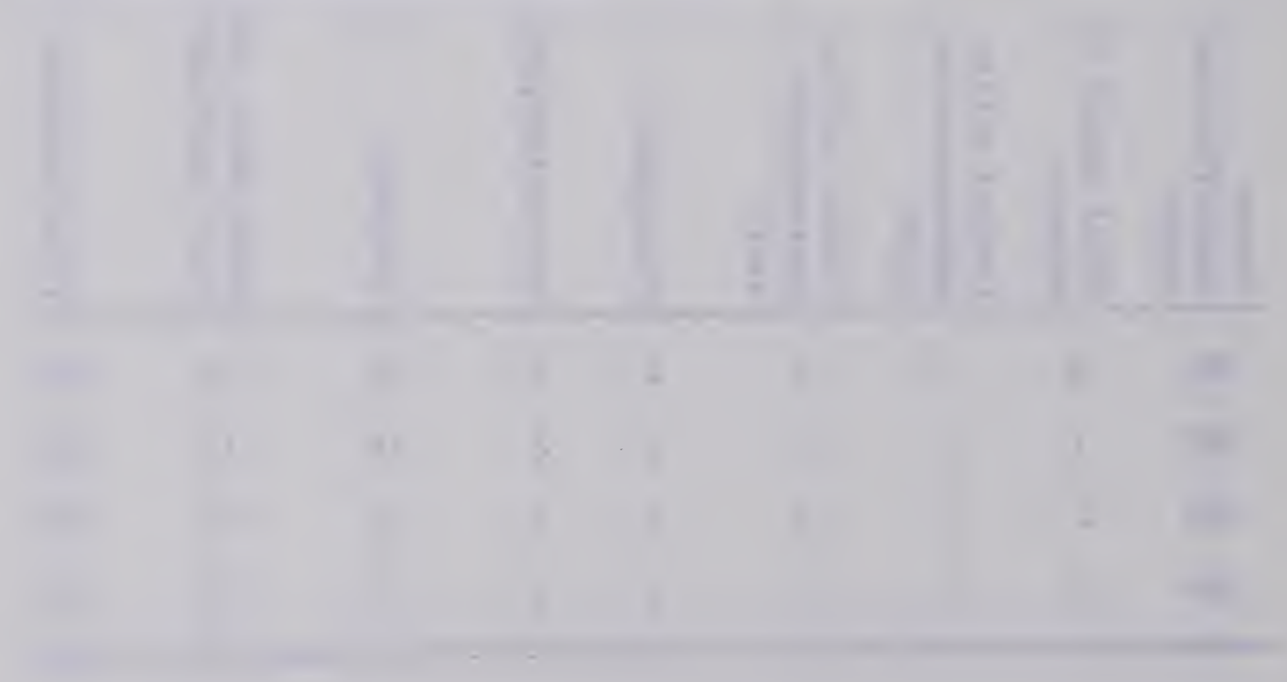

TABLE IV

THE NUMBER OF ADMINISTRATIVE AND PROFESSIONAL EMPLOYEES, THE NUMBER OF STUDENTS, AND THE NUMBER OF SCHOOLS IN SCHOOL DIVISIONS

System identification number	Total number of schools	Central office administrative staff	Central office professional staff	Principals	Vice-principals	Teachers	Total admin. and prof. employees	Total students
401	11	3	0	8	5	61	77	1,200
402	2	2	0	2	1	14	19	251
403	9	4	0	9	8	126	147	2,685
404	16	3	2	13	9	167	194	3,432
405	17	4	1	8	8	124	145	2,850
406	6	2	0	7	3	83	95	1,573
407	8	4	1	7	3	84	99	1,750
408	8	3	1	7	4	75	90	1,525
409	7	3	0	7	7	72	89	1,591
410	13	4	1	11	11	158	185	3,113
411	6	3	1	6	5	77	92	1,568
412	14	5	2	14	11	161	193	3,525
413	8	6	0	8	5	80	99	2,200
414	8	4	2	8	3	58	75	900
415	4	2	0	3	3	42	50	881
416	34	6	2	34	7	187	236	3,850
417	14	4	1	14	9	154	182	3,318
418	7	2	3	3	5	81	94	1,430
419	7	2	0	7	2	53	64	1,097
420	8	3	0	7	7	116	133	2,474
421	8	2	1	8	2	41	54	840
422	4	2	1	3	1	17	24	318
423	11	5	1	11	9	160	186	3,100
424	14	6	3	14	8	133	164	2,644
425	7	4	0	7	9	130	150	2,510
426	10	3	1	7	10	152	173	3,200

TABLE V

THE NUMBER OF ADMINISTRATIVE AND PROFESSIONAL EMPLOYEES, THE NUMBER OF STUDENTS, AND THE NUMBER OF SCHOOLS IN COUNTY SCHOOL SYSTEMS

System identification number	Total number of schools	Central office administrative staff	Central office professional staff	Principals	Vice-principals	Teachers	Total admin. and prof. employees	Total students
501	9	4	0	8	7	130	149	2,626
502	12	4	1	12	3	110	130	2,500
503	12	4	1	12	8	135	160	2,737
504	6	5	1	6	5	120	137	2,309
505	10	3	8	7	6	82	106	1,474
506	11	5	1	11	8	141	166	2,900
507	9	5	1	9	7	166	188	3,428
508	11	9	3	11	14	200	237	3,800
509	6	3	0	6	7	93	109	1,921
510	22	6	4	21	15	218	264	4,517
511	19	6	2	13	7	166	194	3,220
512	11	8	6	11	8	210	243	4,300
513	12	6	1	9	7	89	112	1,758
514	6	3	0	4	4	66	77	1,331
515	10	6	5	10	11	199	231	3,773
516	11	9	7	10	17	238	281	4,338
517	7	3	0	7	6	92	108	1,875
518	5	4	1	5	4	76	90	1,450
519	9	3	0	8	4	62	77	1,311
520	20	9	8	20	19	310	366	6,350
521	5	4	1	5	5	83	98	1,727
522	6	3	0	6	6	87	102	1,768
523	16	6	3	16	8	137	170	2,618
524	10	3	1	9	7	104	124	1,894
525	17	5	1	10	6	112	134	2,115
526	11	3	0	11	8	119	141	2,314
527	14	3	2	9	6	98	118	1,940

was 351. This factor was taken into consideration later in breaking down the group into subgroups.

The group of town districts consisted of thirty-two relatively small school systems. The employee sizes ranged from 12 to 139; the student sizes ranged from 198 to 2,150, and the location sizes from 1 to 5. The rural districts included only four systems of small sizes.

The group of school divisions consisted of twenty-six small and medium sized systems. The employee sizes ranged from 19 to 236; the number of students ranged from 251 to 3,850, and the number of schools ranged from 2 to 34.

The twenty-seven county systems did not include very small systems. The employee size ranged from 77 to 366; the student size ranged from 1,311 to 6,350, and the location size from 9 to 30.

All these five types of school systems together constituted the overall sample. Table VI presents system sizes of the 108 school systems of the overall sample. The systems are arranged in the order of decreasing employee size.

Tables XVIII to XXII in the Appendix B show the computation of administrative components I, II, III and IV from the different categories of administrative employees. As defined in Chapter I, administrative component I consisted of the central office administrative staff; administrative component II consisted of the central office administrative staff plus principals of schools; administrative component III consisted of the central office administrative staff

TABLE VI

EMPLOYEE SIZE, STUDENT SIZE AND LOCATION SIZE OF THE 108 SCHOOL SYSTEMS OF THE SAMPLE

System identification number	Total number of admin. & prof. employees	Total number of students	Total number of schools	System identification number	Total number of admin. & Prof. employees	Total number of students	Total number of schools
102	3,519	72,344	181	425	150	2,510	7
101	3,502	71,827	137	501	149	2,626	9
111	1,464	29,273	72	403	147	2,685	9
110	944	18,931	52	405	145	2,850	17
520	366	6,350	20	526	141	2.314	11
103	351	7,385	15	232	139	2,150	5
105	333	6,120	18	503	137	2,309	6
104	306	5,416	15	525	134	2,115	17
516	281	4,338	11	420	133	2,474	8
510	264	4,517	22	502	130	2,500	12
512	243	4,300	11	524	124	1,894	10
508	237	3,800	11	527	118	1,940	14
416	236	3,850	34	108	118	2,195	8
515	231	3,773	10	513	112	1,758	12
404	194	3,432	16	509	109	1,921	6
511	194	3,220	19	517	108	1,875	7
412	193	3,525	14	505	106	1,474	10
507	188	3,428	9	112	105	2,148	6
423	186	3,100	11	522	102	1,768	6
410	185	3,113	13	413	99	2,200	8
417	182	3,318	14	407	99	1,750	8
426	173	3,200	10	521	98	1,727	5
523	170	2,618	16	406	95	1.573	6
506	166	2,900	11	418	94	1,430	7
424	164	2,644	14	411	92	1,568	6
504	160	2,737	12	408	90	1,525	8
109	150	2,680	7	518	90	1,450	5

NOTE: In Tables VI - VIII the school systems have been ordered on the basis of decreasing employee size.

TABLE VI (continued)

System identification number	Total number of admin.& prof. employees	Total number of students	Total number of schools	System identification number	Total number of admin.& prof. employees	Total number of students	Total number of schools
409	89	1,591	7	208	29	575	1
115	88	1,691	7	118	29	510	2
107	88	1,706	5	223	27	415	1
231	87	1,530	4	422	24	318	4
106	85	1,550	4	216	24	427	2
519	77	1,311	9	214	23	396	1
514	77	1,331	6	119	23	350	2
401	77	1,200	11	218	22	435	1
230	77	1,267	3	229	20	336	1
414	75	900	8	226	20	338	1
419	64	1,097	7	402	19	251	2
207	56	933	3	228	18	272	1
204	56	944	3	220	18	270	1
421	54	840	8	224	17	238	1
114	54	1,302	6	222	17	250	1
117	52	865	4	212	17	250	1
415	50	881	4	209	17	242	2
303	41	694	2	206	17	250	1
304	38	691	2	227	16	282	1
301	36	687	2	219	16	299	1
201	34	497	2	302	15	215	1
217	33	538	2	116	15	292	1
213	32	563	2	225	14	237	1
202	32	558	2	215	14	184	2
205	31	598	3	211	14	216	1
210	30	515	1	113	14	198	1
203	30	554	2	221	12	198	1

plus the principals and vice-principals of schools. The central office staff--administrative and professional--constituted administrative component IV. The data are presented separately for the five subsamples. Table VII presents the administrative components I, II, III and IV of the 108 school systems constituting the sample. The systems are ordered on the basis of decreasing employee size.

Tables XXIII to XLII given in the Appendix B, show computation of administrative ratios using system sizes and administrative components. As mentioned earlier, each definition of administrative component gave three different administrative ratios based on the three size variables. Table XXIII to XXVII give administrative ratios I, II and III, obtained from administrative component I, for the five subsamples; Tables XXVIII to XXXII give administrative ratios IV, V and VI, obtained from administrative component II; Tables XXXIII to XXXVII give administrative ratios VII, VIII and IX, obtained from administrative component III; Tables XXXVIII to XLII give administrative ratios X, XI and XII, obtained from administrative component IV. Each of these tables presents the respective administrative component, the three system sizes and the three administrative ratios computed from these. For the sake of convenience in computation and presentation, the ratios based on employee size have been multiplied by 100 and the ratios based on student size have been multiplied by 1,000.

All the twelve administrative ratios of the 108 school systems of the sample are presented in Table VIII. The systems are ordered on the basis of decreasing employee size.

TABLE VII

ADMINISTRATIVE COMPONENTS I, II, III AND IV OF THE 108 SCHOOL SYSTEMS OF THE SAMPLE

System identification number	Administrative component I	Administrative component II	Administrative component III	Administrative component IV	System identification number	Administrative component I	Administrative component II	Administrative component III	Administrative component IV
102	134	291	522	179	425	4	11	20	4
101	96	233	384	130	501	4	12	19	4
111	34	106	175	40	403	4	13	21	4
110	36	88	126	50	405	4	12	20	5
520	9	29	48	17	526	3	14	22	3
103	11	26	44	12	232	5	10	15	5
105	12	30	56	15	503	5	11	16	6
104	10	25	41	12	525	5	15	21	6
516	9	19	36	16	420	3	10	17	3
510	6	27	42	10	502	4	16	19	5
512	8	19	27	14	524	3	12	19	4
508	9	20	34	12	527	3	12	18	5
416	6	40	47	8	108	2	5	14	3
515	6	16	27	11	513	6	15	22	7
404	3	16	25	5	509	3	9	16	3
511	6	19	26	8	517	3	10	16	3
412	5	19	30	7	505	3	10	16	11
507	5	14	21	6	112	5	11	18	5
423	5	16	25	6	522	3	9	15	3
410	4	15	26	5	413	6	14	19	6
417	4	18	27	5	407	4	11	14	5
426	3	10	20	4	521	4	9	14	5
523	6	22	30	9	406	2	9	12	2
424	6	20	28	9	418	2	5	10	5
506	5	16	24	6	411	3	9	14	4
504	4	16	24	5	408	3	10	14	4
109	3	10	17	3	518	4	9	13	5

TABLE VII (Continued)

System identification number	Administrative component I	Administrative component II	Administrative component III	Administrative component IV	System identification number	Administrative component I	Administrative component II	Administrative component III	Administrative component IV
409	3	10	17	3	208	1	2	3	1
115	5	12	16	5	118	3	5	6	3
107	3	8	11	3	223	3	4	6	3
231	3	7	12	8	422	2	5	6	3
106	6	10	12	6	216	1	3	4	1
519	3	11	15	3	214	1	2	4	1
514	3	7	11	3	119	1	3	4	1
401	3	11	16	3	218	1	2	3	1
230	3	6	10	4	229	2	3	4	2
414	4	12	15	6	226	1	2	3	1
419	2	9	11	2	402	2	4	5	2
207	1	4	7	1	228	2	3	4	2
204	2	5	8	3	220	1	2	3	1
421	2	10	12	3	224	1	2	3	1
114	2	8	11	2	222	2	3	4	2
117	3	7	9	3	212	1	2	4	1
415	2	5	8	2	209	1	2	4	1
303	1	3	5	1	206	1	2	3	1
304	1	3	5	1	227	1	2	3	1
301	1	3	5	1	219	1	2	3	1
201	2	4	5	3	302	2	3	5	2
217	1	3	4	2	116	1	2	3	1
213	1	3	5	1	225	1	2	3	1
202	2	4	6	2	215	1	2	3	1
205	2	3	4	2	211	2	3	3	2
210	1	2	4	1	113	1	2	3	1
203	2	4	6	2	221	1	2	2	1

TABLE VIII

ADMINISTRATIVE RATIOS I TO XII OF THE 108 SCHOOL SYSTEMS OF THE SAMPLE

System identification number	Administrative ratios											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
102	3.81	1.85	0.74	8.27	4.02	1.61	14.83	7.22	2.88	5.09	2.47	0.90
101	2.74	1.34	0.70	6.65	3.24	1.70	10.97	5.35	2.80	3.71	1.81	0.95
111	2.32	1.16	0.47	7.24	3.62	1.47	11.95	5.98	2.43	2.73	1.37	0.56
110	3.81	1.90	0.69	9.32	4.65	1.69	13.35	6.66	2.42	5.30	2.64	0.96
520	2.46	1.42	0.45	7.92	4.57	1.45	13.11	7.56	2.40	4.64	2.68	0.85
103	3.13	1.49	0.73	7.41	3.52	1.73	12.54	5.96	2.93	3.42	1.62	0.80
105	3.60	1.96	0.67	9.01	4.90	1.67	16.82	9.15	3.11	4.50	2.45	0.83
104	3.27	1.85	0.67	8.17	4.62	1.67	13.40	7.57	2.73	3.92	2.22	0.80
516	3.20	2.07	0.82	6.76	4.38	1.73	12.81	8.30	3.27	5.69	3.69	1.45
510	2.27	1.33	0.27	10.23	5.98	1.23	15.91	9.30	1.91	3.79	2.21	0.45
512	3.29	1.86	0.73	7.82	4.42	1.73	11.11	6.28	2.45	5.76	3.26	1.27
508	3.80	2.37	0.82	8.44	5.26	1.82	14.35	8.95	3.09	5.06	3.16	1.09
416	2.54	1.56	0.18	16.95	10.39	1.18	19.92	12.21	1.38	3.39	2.08	0.24
515	2.60	1.59	0.60	6.93	4.24	1.60	11.69	7.16	2.70	4.76	2.92	1.10
404	1.55	0.87	0.19	8.25	4.66	1.00	12.89	7.28	1.56	2.58	1.46	0.31
511	3.09	1.86	0.32	9.79	5.90	1.00	13.40	8.07	1.37	4.12	2.48	0.42
412	2.59	1.42	0.36	9.84	5.39	1.36	15.54	8.51	2.14	3.63	1.99	0.50
507	2.66	1.46	0.56	7.45	4.08	1.56	11.17	6.13	2.33	3.19	1.75	0.67
423	2.69	1.61	0.45	8.60	5.16	1.45	13.44	8.06	2.27	3.23	1.94	0.55
410	2.16	1.28	0.31	8.11	4.82	1.15	14.05	8.35	2.00	2.70	1.61	0.38

TABLE VIII (continued)

System identification number	Administrative ratios											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
417	2.20	1.21	0.29	9.89	5.42	1.29	14.84	8.14	1.93	2.75	1.51	0.36
426	1.73	0.94	0.30	5.78	3.12	1.00	11.56	6.25	2.00	2.31	1.25	0.40
523	3.53	2.29	0.38	12.94	8.40	1.37	17.65	11.46	1.87	5.29	3.44	0.56
424	3.66	2.27	0.43	12.20	7.56	1.43	17.07	10.59	2.00	5.49	3.40	0.64
506	3.01	1.72	0.45	9.64	5.52	1.45	14.46	8.28	2.18	3.61	2.07	0.55
504	2.50	1.46	0.33	10.00	5.85	1.33	15.00	8.77	2.00	3.12	1.83	0.42
109	2.00	1.12	0.43	6.67	3.73	1.43	11.33	6.34	2.43	2.00	1.12	0.43
425	2.67	1.59	0.57	7.33	4.38	1.57	13.33	7.97	2.86	2.67	1.59	0.57
501	2.68	1.52	0.44	8.05	4.57	1.33	12.75	7.24	2.11	2.68	1.52	0.44
403	2.72	1.49	0.44	8.84	4.84	1.44	14.29	7.82	2.33	2.72	1.49	0.44
405	2.76	1.40	0.24	8.28	4.21	0.71	13.79	7.02	1.18	3.45	1.75	0.29
526	2.13	1.30	0.27	9.93	6.05	1.27	15.60	9.51	2.00	2.13	1.30	0.27
232	3.60	2.33	1.00	7.19	4.65	2.00	10.79	6.98	3.00	3.60	2.33	1.00
503	3.65	2.17	0.83	8.03	4.76	1.83	11.68	6.93	2.67	4.38	2.60	1.00
525	3.73	2.36	0.29	11.19	7.09	0.88	15.67	9.93	1.24	4.48	2.84	0.35
420	2.26	1.21	0.38	7.52	4.04	1.25	12.78	6.87	2.12	2.26	1.21	0.38
502	3.08	1.60	0.33	12.31	6.40	1.33	14.62	7.60	1.58	3.85	2.00	0.42
524	2.42	1.58	0.30	9.68	6.34	1.20	15.32	10.03	1.90	3.23	2.11	0.40
527	2.54	1.55	0.21	10.17	6.19	0.86	15.25	9.28	1.29	4.24	2.58	0.36
108	1.69	0.91	0.25	4.24	2.28	0.63	11.86	6.38	1.75	2.54	1.37	0.38
513	5.36	3.41	0.50	13.39	8.53	1.25	19.64	12.61	1.83	6.25	3.98	0.58
509	2.75	1.56	0.50	8.26	4.69	1.50	14.68	8.33	2.67	2.75	1.56	0.50

TABLE VIII (continued)

System identification number	Administrative ratios											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
517	2.78	1.60	0.43	9.26	5.33	1.43	14.81	8.53	2.29	2.78	1.60	0.43
505	2.83	2.04	0.30	9.43	6.78	1.00	15.09	10.85	1.60	10.38	7.46	1.10
112	4.76	2.33	0.83	10.48	5.12	1.83	17.14	8.38	3.00	4.76	2.33	0.83
522	2.94	1.70	0.50	8.82	5.09	1.50	14.71	8.48	2.50	2.94	1.70	0.50
413	6.06	2.73	0.75	14.14	6.36	1.75	19.19	8.64	2.37	6.06	2.73	0.75
407	4.04	2.29	0.50	11.11	6.29	1.37	14.14	8.00	1.75	5.05	2.86	0.63
521	4.08	2.32	0.80	9.18	5.21	1.80	14.29	8.11	2.80	5.10	2.90	1.00
406	2.11	1.27	0.33	9.47	5.72	1.50	12.63	7.63	2.00	2.11	1.27	0.33
418	2.13	1.40	0.29	5.32	3.50	0.71	10.64	6.99	1.43	5.32	3.50	0.71
411	3.26	1.91	0.50	9.78	5.74	1.50	15.22	8.93	2.33	4.35	2.55	0.67
408	3.33	1.97	0.38	11.11	6.56	1.25	15.56	9.18	1.75	4.44	2.62	0.50
518	4.44	2.76	0.80	10.00	6.21	1.80	14.44	8.97	2.60	5.56	3.45	1.00
409	3.37	1.89	0.43	11.24	6.29	1.43	19.10	10.69	2.43	3.37	1.89	0.43
115	5.68	2.96	0.71	13.64	7.10	1.71	18.18	9.46	2.29	5.68	2.96	0.71
107	3.41	1.76	0.60	9.09	4.69	1.60	12.50	6.45	2.20	3.41	1.76	0.60
231	3.45	1.96	0.75	8.05	4.58	1.75	13.79	7.84	3.00	9.20	5.23	2.00
106	7.06	3.87	1.50	11.76	6.45	2.50	14.12	7.74	3.00	7.06	3.87	1.50
519	3.90	2.29	0.33	14.29	8.39	1.22	19.48	11.44	1.67	3.90	2.29	0.33
514	3.90	2.25	0.50	9.09	5.26	1.17	14.29	8.26	1.83	3.90	2.25	0.50
401	3.90	2.50	0.27	14.29	9.17	1.00	20.78	13.33	1.45	3.90	2.50	0.27
230	3.90	2.37	1.00	7.79	4.74	2.00	12.99	7.89	3.33	5.19	3.16	1.33
414	5.33	4.44	0.50	16.00	13.33	1.50	20.00	16.67	1.87	8.00	6.67	0.75

TABLE VIII (continued)

System identification number	Administrative ratios											
	I	I	III	IV	V	VI	VII	VIII	IX	X	XI	XII
419	3.12	1.82	0.29	14.06	8.20	1.29	17.19	10.03	1.57	3.12	1.82	0.29
207	1.79	1.07	0.33	7.14	4.29	1.33	12.50	7.50	2.33	1.79	1.07	0.33
204	3.57	2.12	0.67	8.93	5.30	1.67	14.29	8.47	2.67	5.36	3.18	1.00
421	3.70	2.38	0.25	18.52	11.90	1.25	22.22	14.29	1.50	5.56	3.57	0.38
114	3.70	1.54	0.33	14.81	6.14	1.33	20.37	8.45	1.83	3.70	1.54	0.33
117	5.77	3.47	0.75	13.46	8.09	1.75	17.31	10.40	2.25	5.77	3.47	0.75
415	4.00	2.27	0.50	10.00	5.68	1.25	16.00	9.08	2.00	4.00	2.27	0.50
303	2.44	1.44	0.50	7.32	4.32	1.50	12.20	7.20	2.50	2.44	1.44	0.50
304	2.63	1.45	0.50	7.89	4.34	1.50	13.16	7.24	2.50	2.63	1.45	0.50
301	2.78	1.46	0.50	8.33	4.37	1.50	13.89	7.28	2.50	2.78	1.46	0.50
201	5.88	4.02	1.00	11.76	8.05	2.00	14.71	10.06	2.50	8.82	6.04	1.50
217	3.03	1.86	0.50	9.09	5.58	1.50	12.12	7.43	2.00	6.06	3.72	1.00
213	3.12	1.78	0.50	9.37	5.33	1.50	15.62	8.88	2.50	3.12	1.78	0.50
202	6.25	3.58	1.00	12.50	7.17	2.00	18.75	10.75	3.00	6.25	3.58	1.00
205	6.45	3.34	0.67	9.68	5.02	1.00	12.90	6.69	1.33	6.45	3.34	0.67
210	3.33	1.94	1.00	6.67	3.88	2.00	13.33	7.77	4.00	3.33	1.94	1.00
203	6.67	3.61	1.00	13.33	7.22	2.00	20.00	10.83	3.00	6.67	3.61	1.00
208	3.45	1.74	1.00	6.90	3.48	2.00	10.34	5.22	3.00	3.45	1.74	1.00
118	10.34	5.88	1.50	17.24	9.80	2.50	20.69	11.76	3.00	10.34	5.88	1.50
223	11.11	7.23	3.00	14.81	9.64	4.00	22.22	14.46	6.00	11.11	7.23	3.00
422	8.33	6.29	0.50	20.83	15.72	1.25	25.00	18.87	1.50	12.50	9.43	0.75
216	4.17	2.34	0.50	12.50	7.03	1.50	16.67	9.37	2.00	4.17	2.34	0.50

TABLE VIII (continued)

System identification number	Administrative ratios											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
214	4.35	2.53	1.00	8.70	5.05	2.00	17.39	10.10	4.00	4.35	2.53	1.00
119	4.35	2.86	0.50	13.04	8.57	1.50	17.39	11.43	2.00	4.35	2.86	0.50
218	4.55	2.30	1.00	9.09	4.60	2.00	13.64	6.90	3.00	4.55	2.30	1.00
229	10.00	5.95	2.00	15.00	8.93	3.00	20.00	11.90	4.00	10.00	5.95	2.00
226	5.00	2.96	1.00	10.00	5.92	2.00	15.00	8.88	3.00	5.00	2.96	1.00
402	10.53	7.97	1.00	21.05	15.94	2.00	26.32	19.92	2.50	10.53	7.97	1.00
228	11.11	7.35	2.00	16.67	11.03	3.00	22.22	14.71	4.00	11.11	7.35	2.00
220	5.56	3.70	1.00	11.11	7.41	2.00	16.67	11.11	3.00	5.56	3.70	1.00
224	5.88	4.20	1.00	11.76	8.40	2.00	17.65	12.61	3.00	5.88	4.20	1.00
222	11.76	8.00	2.00	17.65	12.00	3.00	23.53	16.00	4.00	11.76	8.00	2.00
212	5.88	4.00	1.00	11.76	8.00	2.00	23.53	16.00	4.00	5.88	4.00	1.00
209	5.88	4.13	0.50	11.76	8.26	1.00	23.53	16.53	2.00	5.88	4.13	0.50
206	5.88	4.00	1.00	11.76	8.00	2.00	17.65	12.00	3.00	5.88	4.00	1.00
227	6.25	3.55	1.00	12.50	7.09	2.00	18.75	10.64	3.00	6.25	3.55	1.00
219	6.25	3.34	1.00	12.50	6.69	2.00	18.75	10.03	3.00	6.25	3.34	1.00
302	13.33	9.30	2.00	20.00	13.95	3.00	33.33	23.26	5.00	13.33	9.30	2.00
116	6.67	3.42	1.00	13.33	6.85	2.00	20.00	10.27	3.00	6.67	3.42	1.00
225	7.14	4.22	1.00	14.29	8.44	2.00	21.43	12.66	3.00	7.14	4.22	1.00
215	7.14	5.43	0.50	14.29	10.87	1.00	21.43	16.30	1.50	7.14	5.43	0.50
211	14.29	9.26	2.00	21.43	13.89	3.00	21.43	13.89	3.00	14.29	9.26	2.00
113	7.14	5.05	1.00	14.29	10.10	2.00	21.43	15.15	3.00	7.14	5.05	1.00
221	8.33	5.05	1.00	16.67	10.10	2.00	16.67	10.10	2.00	8.33	5.05	1.00

II. STATISTICAL ANALYSIS OF THE DATA

Correlation

The correlations between each of the twelve administrative ratios and the corresponding system size were computed using Pearson product-moment correlation and tested for significance. The computation and testing of correlations were done for the subsamples as well as for the overall sample; the group of four rural school districts was too small for such analysis. A summary of the results of the correlation analysis follows.

Correlations between Employee Size and Ratios Based on Employee Size

Administrative ratio I. Correlation between employee size and administrative ratio I: All subsamples and the overall sample showed negative correlations significant at or below the 0.025 level.

Administrative ratio IV. Correlation between employee size and administrative ratio IV: All subsamples and the overall sample showed significant negative correlations at or below the 0.01 level.

Administrative ratio VII. Correlation between employee size and administrative ratio VII: All subsamples and the overall sample showed significant negative correlation at or below the 0.01 level.

Administrative ratio X. Correlation between employee size and administrative ratio X: County systems failed to show correlation significant at the 0.05 level; all the other subsamples and the

overall sample showed significant negative correlation at the 0.005 level.

Correlations between Student Size and Ratios Based on Student Size

Administrative ratio II. Correlation between student size and administrative ratio II: City school districts failed to show correlation significant at the 0.05 level; the other subsamples and the overall sample showed significant negative correlation at or below the 0.05 level.

Administrative ratio V. Correlation between student size and administrative ratio V: All subsamples and the overall sample showed negative correlation significant at or below the 0.05 level.

Administrative ratio VIII. Correlation between student size and administrative ratio VIII: All subsamples and the overall sample showed negative correlation significant at or below the 0.05 level.

Administrative ratio XI. Correlation between student size and administrative ratio XI: City school districts failed to show correlation significant at the 0.05 level; the other subsamples and the overall sample showed significant negative correlation at or below the 0.05 level.

Correlations between Location Size and Ratios Based on Location Size

Administrative ratio III. Correlation between location size and administrative ratio III: All subsamples showed negative correlation significant at or below the 0.025 level; but the overall sample failed to show significant correlation at the 0.05 level.

Administrative ratio VI. Correlation between location size and administrative ratio VI: Three subsamples showed significant negative correlation at or below the 0.05 level; but the city school districts and the overall sample failed to show correlation significant at the 0.05 level.

Administrative ratio IX. Correlation between location size and administrative ratio IX: Three subsamples showed negative correlation significant at or below the 0.025 level; but the city school districts and the overall sample failed to show correlation significant at the 0.05 level.

Administrative ratio XII. Correlation between location size and administrative ratio XII: Two subsamples showed negative correlation significant at or below the 0.05 level; town school districts and the overall sample failed to show significant correlation at the 0.05 level; city school districts showed positive correlation significant at the 0.05 level.

Discussion

These findings showed that, in general, administrative ratios

were negatively correlated to system size when the latter was expressed in terms of either the employee size or the student size. Although administrative ratios showed significant correlation to location size in certain subsamples, no significant correlation was obtained in the overall sample. In one case one subsample showed significant positive correlation between location size and administrative ratio.

In all but one case correlations between administrative ratios and system size were negative. Difference in the definition of administrative component did not seem to make any difference in the direction of correlation.

The results of the correlation analysis are presented in Table IX.

Mean Administrative Ratios in Groups of Small and Large Systems

The 108 school systems of the sample were grouped into four groups of very small, small, medium and large sized systems, and the means and standard deviations of administrative ratios were computed for the four groups. The results are presented in Tables X - XII. In general, groups of larger systems had smaller mean administrative ratios: the means of administrative ratios based on location size were higher in the group of the four largest systems than in groups of small and medium sized systems.

Multiple Regression Analysis, Using One-Predictor Model

Administrative ratio was assumed to be a function of the size of school system. Multiple regression analysis was applied to the

TABLE IX

PEARSON PRODUCT-MOMENT CORRELATION (r), WITH LEVEL OF PROBABILITY (P), BETWEEN ADMINISTRATIVE RATIOS AND EMPLOYEE SIZE, STUDENT SIZE, AND LOCATION SIZE IN THE SUBSAMPLES AND IN THE OVERALL SAMPLE

Cases		City school districts N = 19		Town school districts N = 32		School divisions N = 26		County school systems N = 27		Overall sample N = 108	
		r	P	r	P	r	P	r	P	r	P
Correlation between employee size and admin. ratio:	I	-0.592	0.005	-0.552	0.005	-0.825	0.005	-0.390	0.025	-0.618	0.005
	IV	-0.697	0.005	-0.662	0.005	-0.682	0.005	-0.452	0.010	-0.529	0.005
	VII	-0.701	0.005	-0.664	0.005	-0.705	0.005	-0.462	0.010	-0.554	0.005
	X	-0.650	0.005	-0.553	0.005	-0.708	0.005	-0.238		-0.501	0.005
Correlation between student size and admin. ratio:	II	-0.344		-0.474	0.005	-0.677	0.005	-0.371	0.050	-0.185	0.050
	V	-0.440	0.050	-0.555	0.005	-0.615	0.005	-0.465	0.010	-0.245	0.010
	VIII	-0.432	0.050	-0.557	0.005	-0.637	0.005	-0.441	0.010	-0.246	0.010
	XI	-0.375		-0.498	0.005	-0.635	0.005	-0.265		-0.192	0.025
Correlation between location size and admin. ratio:	III	-0.461	0.025	-0.407	0.010	-0.561	0.005	-0.504	0.005	-0.144	
	VI	-0.114		-0.421	0.010	-0.368	0.050	-0.481	0.005	-0.133	
	IX	-0.175		-0.360	0.025	-0.402	0.025	-0.453	0.010	-0.068	
	XII	+0.404	0.050	-0.251		-0.431	0.025	-0.330	0.050	-0.040	

NOTE: In cases where P is not given in the Table, P was above the 0.05 level; the values of P correspond to a two-tailed test.

TABLE X

MEANS AND STANDARD DEVIATIONS OF THE ADMINISTRATIVE RATIOS BASED ON EMPLOYEE SIZE IN GROUPS OF SCHOOL SYSTEMS OF DIFFERENT SIZES

Group designation	Number in group	Size range	Mean of administrative ratio				Standard deviation of administrative ratio			
			I	IV	VII	X	I	IV	VII	X
Very small	29	12 - 30	7.40	13.83	19.86	7.55	2.97	3.95	4.48	3.12
Small	53	31 - 150	3.60	10.14	15.09	4.41	1.29	2.78	2.77	1.92
Medium	22	160 - 366	2.80	9.19	14.22	3.95	0.61	2.41	2.26	1.05
Large	4	944 - 3,519	3.17	7.87	12.78	4.20	0.75	1.18	1.68	1.21

NOTE: The mean ratios and standard deviations in this table have been multiplied by 100.

TABLE XI

MEANS AND STANDARD DEVIATIONS OF THE ADMINISTRATIVE RATIOS BASED ON STUDENT SIZE IN GROUPS OF SCHOOL SYSTEMS OF DIFFERENT SIZES

Group designation	Number in group	Size range	Mean of administrative ratio				Standard deviation of administrative ratio			
			II	V	VIII	XI	II	V	VIII	XI
Very small	29	12 - 30	4.74	8.86	12.71	4.85	2.16	3.21	3.99	2.31
Small	53	31 - 150	2.10	5.93	8.81	2.61	0.80	1.94	2.04	1.36
Medium	22	160 - 366	1.63	5.37	8.29	2.32	0.41	1.63	1.62	0.72
Large	4	944 - 3,519	1.56	3.88	6.30	2.07	0.37	0.60	0.81	0.59

NOTE: The mean ratios and standard deviations in this table have been multiplied by 1,000.

TABLE XII

MEANS AND STANDARD DEVIATIONS OF THE ADMINISTRATIVE RATIOS BASED ON LOCATION SIZE IN GROUPS OF SCHOOL SYSTEMS OF DIFFERENT SIZES

Group designation	Number in group	Size Range	Mean of administrative ratio				Standard deviation of administrative ratio			
			III	VI	IX	XII	III	VI	IX	XII
Very small	29	12 - 30	1.17	2.13	3.12	1.18	0.59	0.65	0.99	0.58
Small	53	31 - 150	0.53	1.44	2.18	0.65	0.26	0.36	0.53	0.58
Medium	22	160 - 366	0.47	1.42	2.26	0.67	0.20	0.25	0.54	0.33
Large	4	944 - 3,519	0.65	1.62	2.63	0.87	0.12	0.11	0.24	0.20

data, with administrative ratio as criterion and system size as predictor. The regression weight thus obtained would indicate the direction and extent of the dependence of the administrative ratio on system size.

There was justification from earlier research to assume that a logarithmic function best represented the relationship between administrative ratio and system size. For example, Gill had found the relationship between these two variables in his sample to be "curvilinear, asymptotic, and logarithmic." (3:49).

A simplified form of a one-predictor regression model which represented the above mentioned kind of relationship was:

$$Y = A_0 + A_1 \log X_1$$

Where Y was the criterion, $\log X_1$ was the predictor, and A_0 was a constant for all the subjects represented by a particular equation. In the case at hand, as mentioned above, Y represented the administrative ratio, and X_1 represented the system size. The size variable that was used in the one-predictor model of the multiple regression analysis reported here was the employee size. The four definitions of administrative component (see Chapter I) gave four administrative ratios based on employee size. These four administrative ratios were used, one at a time, as criterion in the regression model. Thus there were four cases to which the model was applied. The findings from this part of the analysis are given below.

Case 1. In case 1, Y represented the administrative ratio obtained by dividing administrative component I (number of central office administrative staff), by the employee size of the school system. In this case computation showed:

$$A_0 = 10.432$$

$$A_1 = -1.382$$

Therefore the regression equation could be written as:

$$Y = 10.432 - 1.382 \log X$$

where Y was the administrative ratio used in the case and X was the employee size of the school system. The squared multiple correlation (RSQ) obtained in this case was 0.381, and the probability of the null hypothesis $A_1 = 0$ was $<.001$. This meant that in this case 38.1 per cent of the variability of Y was accounted for by log X.

Case 2. In case 2, Y represented the administrative ratio obtained by dividing the administrative component II (central office administrative staff plus school principals), by the employee size of the school system. In this case the regression equation obtained through computation was:

$$Y = 17.947 - 1.638 \log X$$

The predictor accounted for 27.9 per cent of the variability of the criterion, at a high level of significance.

Case 3. In case 3, Y represented the administrative ratio obtained by dividing the administrative component III (central office administrative staff plus principals and vice-principals of

schools), by the employee size of the school system. In this case the regression equation obtained through computation was:

$$Y = 24.368 - 1.906 \log X$$

The predictor accounted for 30.7 per cent of the variability of the criterion, at a high level of significance.

Case 4. In case 4, Y represented the administrative ratio obtained by dividing administrative component IV (central office administrative and professional staff), by the employee size of the school system. The regression equation obtained through computation was:

$$Y = 9.933 - 1.103 \log X$$

The predictor accounted for 23.6 per cent of the variability of the criterion, at a high level of significance.

The values of A_0, A_1, RSQ and P obtained in the four cases discussed above are presented in summary form in Table XIII.

Discussion

In a regression equation, the positive or negative sign of the regression weight of the predictor (independent variable) is an indicator of the direction in which the value of the predictor affects the value of the criterion (dependent variable). If the regression weight is positive the value of the criterion will increase as the value of the predictor increases, and vice versa; if the regression weight is negative the value of the criterion will decrease as the value of the predictor increases, and vice versa. In the former case

TABLE XIII

RESULTS OF THE MULTIPLE REGRESSION ANALYSIS OF THE DATA, WITH ADMINISTRATIVE RATIO AS CRITERION, AND LOGARITHM OF EMPLOYEE SIZE AS PREDICTOR

Case	A_0	A_1	RSQ	P*
1	10.432	-1.382	0.381	0.000
2	17.947	-1.638	0.279	0.000
3	24.368	-1.906	0.307	0.000
4	9.933	-1.103	0.236	0.000

*A P level of 0.000 reported in this and other tables refers to a level < 0.001.

the dependence of the criterion on the predictor may be said to be in the positive direction, and in the latter case the same may be said to be in the inverse or negative direction. Dependence as used here denotes statistical, and not necessarily causal, dependence.

In the multiple regression analysis reported above, the regression weight of the predictor variable, employee size, was negative in each of the four cases. This meant that the direction of the dependence of administrative ratio on system size was negative. In other words, administrative ratio decreased as system size increased. The inverse relationship between administrative ratio and system size was true in the case of all the four definitions of administrative ratio used in the analysis, and this relationship was statistically significant in all the cases.

This finding confirms the conclusion reached earlier in this chapter by the application of Pearson product-moment correlation to the data. The correlation between administrative ratio and employee size was significantly negative, and the use of different definitions of administrative ratio did not affect the direction of the correlation.

The variability of the administrative ratio accounted for by the logarithm of employee size, or, the extent of the dependence of administrative ratio on system size, was fairly high in all the four cases--considering the nature of the dependent and independent variables used. The analysis thus showed that system size could be used as a predictor of administrative ratio.

The results of the regression analysis reported above are represented graphically in Figure 1. Administrative ratios are plotted against the respective system sizes (employee size) on a semilogarithmic grid and a regression line representing

$$Y = 24.37 - 1.906 \log X \quad \text{(case 3)}$$

has been drawn.

Multiple Regression Analysis, Using Three-Predictor Model

The location size and the student size, as well as the employee size, were considered likely to affect the administrative ratio in school systems. The location size or the number of schools in a school system represents the number of locations at which the services of the school organization are performed; the student size represents the number of people served by the organization. As a matter of fact Anderson and Warkov (1:27) have suggested that increase in the location size of an organization could affect the relative size of its administrative component in a direction opposite to the direction of the effect of an increase in its employee size. Further, according to Ferguson (2:390-94), by using several meaningful predictors in the multiple regression model, the correlation between the criterion and the weighted sum of predictors can be maximized. Therefore, a multiple regression model with administrative ratio as criterion and the three size variables as predictors was applied to the data.

With three predictor variables, the multiple regression model was of the form

$$Y = A_0 + A_1 \log X_1 + A_2 \log X_2 + A_3 \log X_3$$

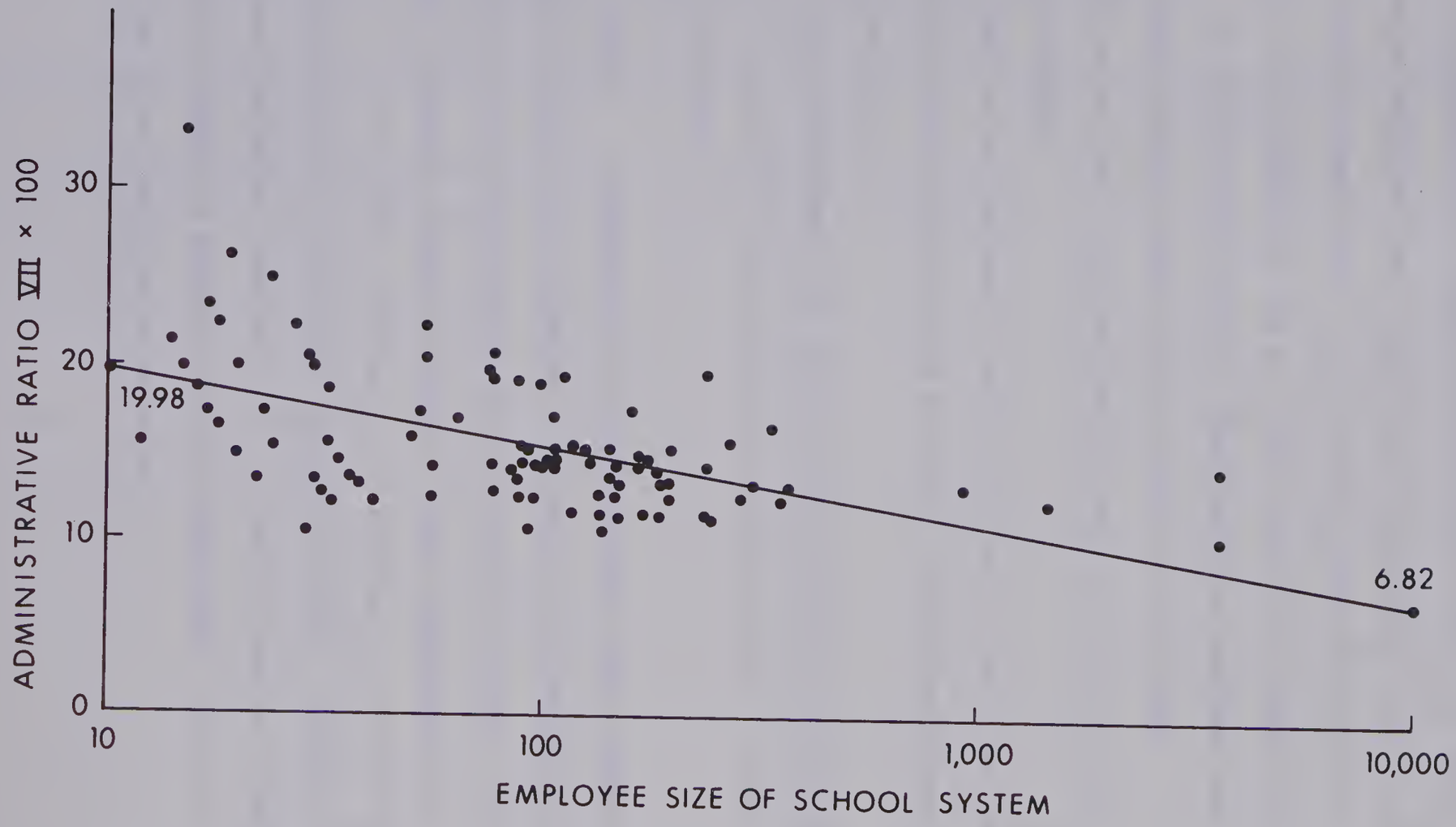

FIGURE 1: RELATIONSHIP BETWEEN ADMINISTRATIVE RATIO AND SYSTEM SIZE IN 108 ALBERTA SCHOOL SYSTEMS.

where Y represented the administrative ratio, and X_1, X_2 and X_3 represented employee size, student size and location size of the school system respectively. A_1, A_2 and A_3 were the regression weights of the predictors log X_1, log X_2 and log X_3 respectively.

As the four definitions of administrative component gave three administrative ratios each in relation to the three definitions of size, there were twelve cases to which the model could be applied.

Each of the regression weights obtained in every case was tested for significance by using an F-test for null hypotheses $A_1 = 0$, $A_2 = 0$ etc.

The findings from the analysis are presented and discussed below. The results of the analysis are also presented in summary form in Table XIV.

Case 1. Y represented the administrative ratio obtained by dividing administrative component I (central office administrative staff), by size I (the employee size of the school system). The multiple regression equation obtained through computation was:

$$Y = 18.1118 + 2.415 \log X_1 - 3.2743 \log X_2 - 0.409 \log X_3$$

The squared multiple correlation--RSQ--was = 0.3982. However, in this case, the values obtained for A_1, A_2 and A_3 were not significant at the 0.05 level and therefore the null hypotheses, viz, $A_1 = 0$, $A_2 = 0$ and $A_3 = 0$ could not be rejected.

TABLE XIV

RESULTS OF THE MULTIPLE REGRESSION ANALYSIS OF THE DATA WITH ADMINISTRATIVE RATIO AS CRITERION, AND LOGARITHMS OF EMPLOYEE SIZE (X_1), STUDENT SIZE (X_2), AND LOCATION SIZE (X_3) AS THREE PREDICTORS

Case	A_0 Constant	A_1 Regression weight of log. X_1	A_2 Regression weight of log. X_2	A_3 Regression weight of log. X_3	Probability P			RSQ
					$A_1 = 0$	$A_2 = 0$	$A_3 = 0$	
1	18,1118	2,4148	-3.2743	-0.4093	0.28164	0.09541	0.48149	0.3982
2	20.2877	4.7382	-5.2648	-0.2417	0.00144	0.00006	0.51547	0.4770
3	1.1532	1.0459	-0.5360	-0.7061	0.00643	0.10105	0.00000	0.4703
4	39.7127	-1.9894	-3.8608	4.5701	0.42672	0.13864	0.0000	0.5152
5	45.7130	6.3927	-9.9764	2.8369	0.00051	0.00000	0.0000	0.6417
6	1.4783	1.2073	-0.5017	-0.9157	0.00025	0.15901	0.0000	0.8020
7	49.3790	0.0000	-5.5627	4.0579	1.0000	0.04457	0.000	0.4810
8	61.9273	11.4340	-14.7629	2.4525	0.0000	0.0000	0.00002	0.6660
9	1.2925	2.4101	-0.8958	-1.7546	0.00001	0.04309	0.0000	0.6460
10	30.3674	7.3696	-7.9180	-0.2492	0.00266	0.00025	0.68763	0.3311
11	29.3857	8.2258	-8.6166	-0.869	0.0000	0.0000	0.81771	0.4693
12	2.4516	1.8482	-1.1650	-0.8042	0.00001	0.00125	0.0000	0.4311

Case 2. Y represented the administrative ratio obtained by dividing administrative component I by size II (the number of students in the system). The multiple regression equation obtained through computation was:

$$Y = 20.288 + 4.738 \log X_1 - 5.265 \log X_2 - 0.242 \log X_3$$

The predictors accounted for 47.7 per cent of the variability of the criterion. In this case the value of A_3 was not significant at the .05 level; the values of A_2 and A_1 were significant at the 0.001 level.

Case 3. Y represented the administrative ratio obtained by dividing administrative component I by system size III (the number of schools in the system). The multiple regression equation obtained was:

$$Y = 1.153 + 1.046 \log X_1 - 0.536 \log X_2 - 0.706 \log X_3$$

The predictors accounted for 47.03 per cent of the variability of the criterion. In this case the values of A_1 and A_3 were significant at the .01 level, but the value of A_2 was not significant at the .05 level.

Case 4. Y represented the administrative ratio obtained by dividing administrative component II (the central office administrative staff plus school principals in the system) by the system Size I. The multiple regression equation obtained was:

$$Y = 39.7127 - 1.989 \log X_1 - 3.861 \log X_2 + 4.570 \log X_3$$

The predictors accounted for 51.52 per cent of the variability of the criterion. In this case A_3 was significant at the .01 level, but A_2 and A_1 were not significant at the .05 level.

Case 5. Y represented the administrative ratio obtained by dividing administrative component II by system size II. The multiple regression equation obtained was:

$$Y = 45.713 + 6.392 \log X_1 - 9.976 \log X_2 + 2.837 \log X_3$$

The predictors accounted for 64.17 per cent of the variability of the criterion. In this case the values of A_1, A_2 and A_3 were significant at the 0.01 level.

Case 6. Y represented the administrative ratio obtained by dividing administrative component II by system size III. The multiple regression equation obtained in this case was:

$$Y = 1.478 + 1.207 \log X_1 - 0.502 \log X_2 - 0.916 \log X_3$$

The predictors accounted for 50.20 per cent of the variability of the criterion. In this case the values of A_1 and A_3 were significant at the 0.01 level, but the value of A_3 was not significant at the 0.05 level.

Case 7. Y represented the administrative ratio obtained by dividing administrative component III (central office administrative staff plus principals and vice-principals of schools) by system size I. The multiple regression equation obtained was:

$$Y = 49.379 + 0.0 \log X_1 - 5.563 \log X_2 + 4.058 \log X_3$$

The predictors accounted for 48.10 per cent of the variability of the criterion. In this case the value of A_2 was significant at the 0.05 level and A_3 was significant at the .01 level; the value of A_1 was 0.0.

Case 8. Y represented administrative ratio obtained by dividing administrative component III by system size II. The multiple regression equation obtained was:

$$Y = 61.927 + 11.434 \log X_1 - 14.763 \log X_2 + 2.453 \log X_3$$

The predictors accounted for 66.60 per cent of the variability of the criterion. In this case the values of A_1, A_2 and A_3 were significant at the .01 level.

Case 9. Y represented administrative ratio obtained by dividing administrative component III by system size III. The multiple regression equation obtained was:

$$Y = 1.293 + 2.410 \log X_1 - 0.896 \log X_2 - 1.76 \log X_3$$

The predictors accounted for 64.6 per cent of the variability of the criterion. In this case weights A_1 and A_3 were significant at the .01 level, and A_2 was significant at the .05 level.

Case 10. Y represented the ratio obtained by dividing administrative component IV (central office administrative and professional staff) by size 1. The multiple regression equation obtained was:

$$Y = 30.367 + 7.370 \log X_1 - 7.918 \log X_2 - 0.249 \log X_3$$

The predictors accounted for 33.11 per cent of the variability

of the criterion. In this case A_1 and A_2 were significant at the .01 level, but A_3 was not significant at the .05 level.

Case 11. Y represented the ratio obtained by dividing administrative component IV by size II. The multiple regression equation obtained was:

$$Y = 29.386 + 8.226 \log X_1 - 8.617 \log X_2 - 0.869 \log X_3$$

The predictors accounted for 46.93 per cent of the variability of the criterion. In this case A_1 and A_2 were significant at the .01 level, but A_3 was not significant at the .05 level.

Case 12. Y represented the ratio obtained by dividing administrative component IV by size III. The multiple regression equation obtained was:

$$Y = 2.4516 + 1.8482 \log X_1 - 1.1650 \log X_2 - 0.8042 \log X_3$$

The predictors accounted for 43.11 per cent of the variability of the criterion. In this case A_1, A_2 and A_3 were significant at the .01 level.

Discussion

Predictive power of the multiple regression model used. In the twelve cases cited above, the RSQ value ranged from .33 to .67. In the last three of these cases Y was ratios of administrative component IV--central office administrative and professional staff; these ratios were not administrative ratios by strict definition. If these three cases were excluded, the range of the RSQ value would be

from .47 to .67. (Case 1 was not considered; none of the regression weights was significant in that case.) The percentage of the variability of the administrative ratio by strict definition accounted for by the three system-size variables, therefore, ranged from 47 to 67. This should be considered quite a high predictive power as far as the nature of the variables used are concerned. The highest RSQ value obtained by the application of the one-predictor multiple regression model in the first part of this analysis was .38 (case 1). Therefore the use of the three size variables in a multiple regression model as predictors of administrative ratio may be said to be justified. In other words, the dependence of the administrative ratio on system size is better expressed by the weighted sum of the correlations of the three size variables to the administrative ratio than by the correlation of only one of these variables to the administrative ratio.

Independent contribution of the three predictors. The gain in the estimation of the variance of administrative ratio by the addition of each size variable as a predictor in the multiple regression model was not quantitatively ascertained in the analysis reported in the latter part of this chapter. But the regression weights of each of the predictors in every case was tested for significance using an F-test. Snedecor and Cochran have recommended (3:386-89) this method of testing individual regression weights by F-tests of null hypotheses as an effective technique to establish

the non-negligibility of the contribution of the respective predictors. According to them, "this method of testing a partial regression coefficient may appear strange at first but is very general." (3:388). Where the regression weight of a particular predictor is found to be statistically significant the inclusion of that predictor improves the multiple regression model, and the predictor variable may be said to have an independent contribution toward the estimation of the criterion.

In the present case a large majority of the regression weights of each of the three size variables used as predictors turned out to be statistically significant. This meant that these three size variables had, in general, independent contributions in the estimation of the variance of the administrative ratio.

Direction of the dependence of administrative ratios on each of the size variables. Looking at the regression weights of the three predictors in the several cases, certain patterns were seen emerging. The values of A_1 were significant in nine out of the twelve cases. All these significant values of A_1 were positive. This suggested that the direction of the dependence of Y on X_1 was positive. In other words, the direction of the dependence of the administrative ratio on the employee size of the school system was in general positive.

The values of A_2 were significant in eight out of the twelve cases. All these significant values were negative. This meant that

the direction of the dependence of Y on X_2 was negative. In other words, the direction of the dependence of the administrative ratio on the student size of a school system was in general negative or inverse.

The values of A_3 were significant in eight out of the twelve cases. Of these, four were positive and four were negative. Thus four cases suggested a positive direction for the dependence of administrative ratio on location size while the four other cases suggested a negative direction. The results in this case were inconclusive.

Increased information from the three predictor multiple regression analysis. The use of the three-predictor multiple regression model brought more information about the relationship between administrative ratio and system size than did the use of the one-predictor model.

The application of the one-predictor regression model showed the direction of the dependence of the administrative ratio on the independent size variable, to be negative or inverse. But the three-predictor multiple regression analysis showed difference in the directions of the dependence of administrative ratio on the three different size variables. All the significant regression weights of employee size were positive, all the significant regression weights of student size were negative and the significant regression weights of location size were equally divided between positive and negative values.

What seemed to result from the three-predictor regression analysis was a further differentiation of the nature of the dependence of administrative ratio on system size than was visible in the one-predictor analysis. In the one-predictor model where employee size was used as predictor, no control for the possible effects of the other size variables had been employed and these other size variables also could have influenced the consistent inverse relationship the analysis showed between administrative ratio and employee size. When the three size variables were used as three predictors, the regression weights obtained for each of the size variables were free from biases from the others. For example, the positive weights of employee size indicated that when the influence of changes in student size and in location size were controlled for, an increase in the employee size gave an increase in the administrative ratio in school systems.

Evaluation of the relative contributions of the predictors. The size variable to which administrative ratio consistently showed dependence in the inverse direction was student size. The direction of the dependence of administrative ratio on employee size was in all significant cases positive. This suggested that the inverse relationship administrative ratio showed to employee size in the one-predictor regression analysis and in the correlation analysis had been biased by student size. If the influence of student size and location size were to be controlled for, administrative ratio would show a positive relationship to employee size.

However, as Ferguson observes (2:401), the evaluation of the quantitative contributions of different predictors cannot be made by a simple comparison of their regression weights. Such an evaluation involves consideration of other factors, for example, the correlation among the predictors themselves. Estimation of the magnitude of individual contributions of the predictors was not attempted in the study.

Snedecor and Cochran (4:394-95) make a further point when they say that an investigator, when he selects certain variables to use as predictors in a multiple regression model can "never be sure that there are not other X-variables related to Y in the population sampled." (4:394). These variables which the investigator thinks are unimportant or are not feasible to measure or record, nonetheless may bias the regression weights. This kind of possibility, of course, could not be ruled out in the case of the multiple regression analysis reported here.

Summary of Chapter IV

The analyses reported in this chapter were aimed at testing hypothesis I: The administrative ratio in school systems decreases as the system size increases.

Twelve administrative ratios in all obtained from four definitions of administrative component and three definitions of system size were examined.

All the twelve administrative ratios in the overall sample showed negative Pearson product-moment correlation to system size; eight out of these twelve correlations were significant at or below the 0.05 level. The one-predictor model multiple regression analysis showed the direction of the dependence of the administrative ratio on system size to be negative or inverse in all the four cases. As noted above, although employee size was used as the predictor, the influence of the other size variables also was reflected in the regression weights obtained. Mean administrative ratios were, in general, larger in groups of smaller systems than those in groups of larger systems.

The hypothesis I, therefore, was accepted in its general form. The administrative ratio decreased as system size (without specifying any particular size variable) increased.

The three-predictor model multiple regression analysis showed differentiation in the direction of the dependence of administrative ratio on the different size variables. This direction was positive with respect to employee size, negative with respect to student size, and divided between positive and negative with respect to location size.

Therefore if a hypothesis were to specify the relationship between administrative ratio and a particular size variable (employee size, student size or location size), the influence of the others being controlled for, then conclusions would have to be differentiated:

administrative ratio increased as employee size increased; administrative ratio decreased as student size increased. The finding with respect to location size was inconclusive.

These conclusions might seem to contradict the conclusion from the results of the one-predictor multiple regression analysis and of the computation of correlations and mean administrative ratios reported earlier. The contradiction was only apparent. The three-predictor multiple regression analysis brought out the contribution of each of the three size variables, independent of one another, toward administrative ratio. In an actual situation the administrative ratio in a school system was determined, as far as it was determined by system size, by the weighted sum of the independent contributions of the different size variables. There was no contradiction in this weighted sum being negative while the independent contributions of one or two of the variables were in the positive direction. As explained earlier, the results of the one-predictor multiple regression analysis reflected the net effect of system size on administrative ratio. The same was true of the correlations and the mean administrative ratios.

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CHAPTER V

THE RELATIONSHIP BETWEEN THE OCCURRENCE OF ADMINISTRATIVE OFFICES AND THE SIZE OF SCHOOL SYSTEMS

The purpose of the data analysis carried out in this chapter was to test hypothessis II, that each administrative office began to occur consistently at a specific size of school system. The technique employed for the purpose was to rank all the school systems of the sample in the order of employee size, from the smallest to the largest, and to make a simple frequency count of the occurrence of each office.

I. ANALYTICAL PROCEDURES

Threshold System Sizes

As defined in Chapter I, the occurrence of a particular office was considered to be related to a certain system size if the office occurring in a system of that size occurred consistently in systems of that size and larger. Occurrence in at least 50 per cent of the cases concerned was arbitrarily accepted as "consistent" occurrence. The system size at which a particular administrative office began to appear consistently was called the threshold size of that office.

Reference to Systems

Following Gill's procedure (1:52), the convention of referring to school systems by their size has been adopted in this chapter. The size used for the purpose is the employee size of the school system.

For example, a system with an employee size of 75 is referred to as system 75. If more than one system have the same employee size, say, 75, they are referred to as system 75a, 75b, etc.

Division of the Sample into Groups of Large and Small Systems

The sample included four large school systems which stood out from the remaining 104 school systems in size. The sizes of the large systems were 944, 1,464, 3,205 and 3,519 while the largest of the others had only a size of 366. An examination of the data showed that the four largest systems contrasted markedly with the remaining 104 systems with regard to the number and kinds of administrative offices. Many of the offices appearing in these large systems were not relevant to the other 104 systems. This group of the four largest systems was therefore examined and discussed separately from the remaining group of smaller systems.

Categorization of Administrative Offices

Examination of data indicated that the name for a particular administrative office differed among school systems. For the purpose of estimating threshold sizes of administrative offices it was necessary to recognize each office by its function even when the nomenclature varied, and to impose a single title for each. Therefore, the administrative positions reported by the various school systems were listed in groups by similarity of function and given a title by which they were subsequently recognized and counted. This operation is shown in Table XV.

TABLE XV

CATEGORIZATION OF THE ADMINISTRATIVE OFFICES REPORTED BY THE 104 SMALLER SCHOOL SYSTEMS OF THE SAMPLE

Offices reported by school systems	Category of office
Superintendent Superintendent of Schools District Superintendent	Superintendent
Assistant Superintendent Deputy Superintendent Assistant to Superintendent	Assistant Superintendent
Supervisor of Instruction Supervisor of Education Supervisor of Schools Co-ordinator of Instructional Services	Supervisor of Instruction
Supervisor of Elementary Education Supervisor of Elementary Instruction Co-ordinator of Elementary Education	Supervisor of Elementary Education
Co-ordinator of Secondary Education	Co-ordinator of Secondary Education
Director of Guidance Co-ordinator of Guidance Co-ordinator of Guidance and Counselling Co-ordinator of Guidance and Special Services Co-ordinator of Special Services Supervisor of Guidance Supervisor of Guidance and Special Education Consultant Student Personnel Services	Director of Guidance
Supervisor of: Music, Physical Education Art, Industrial Art	Subject Supervisor
Consultant in: Music, Oral French, Elementary Science, Reading, Art, Band	Subject Consultant
A/V Supervisor A/V Co-ordinator A/V Consultant	A/V Supervisor

TABLE XV (continued)

Offices reported by school systems	Category of Office
Librarian (System wide) District Librarian Library Officer Consultant in Library Services Library Consultant	Library Officer
Secretary-Treasurer Secretary, Treasurer Secretary of Schools	Secretary-Treasurer
Assistant Secretary-Treasurer Deputy Secretary-Treasurer	Assistant Secretary-Treasurer
Accountant School Affairs Accountant	Accountant
Building and Maintenance Supervisor Maintenance Supervisor Building Supervisor Plant Manager Plant Maintenance Supervisor Maintenance Foreman	Building and Maintenance Supervisor
Purchasing Agent	Purchasing Agent
Truant Officer	Truant Officer
Curriculum Materials Assistant	Curriculum Materials Assistant
Program Assistant	Program Assistant

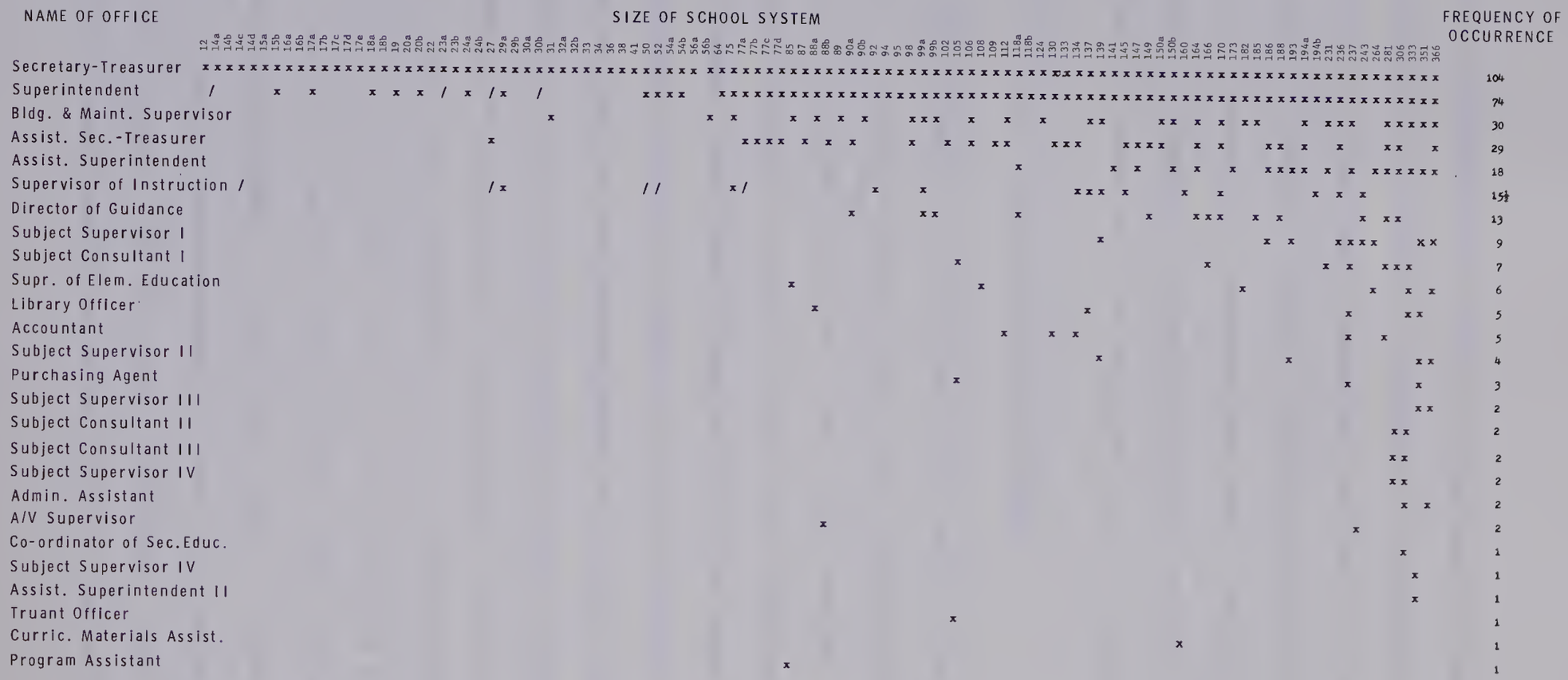
II. SMALLER SYSTEMS

The occurrence of administrative offices in the group of 104 school systems, ranging in size from 12 to 366, is represented in Figure 2. The administrative offices are set out on the left hand side in descending order of their frequency of occurrence; the school systems represented by size are set out along the upper horizontal edge of the figure from left to right in the ascending order of size. The occurrence of an administrative office is represented by an "x" mark in the appropriate box. In cases where more than one system shared one officer, the occurrence of that office in each of those systems is marked by just one stroke (/). Thus the frequency of occurrence of any office may be read off from Figure 2, and the threshold size of the office may be determined.

Diversification of Administrative Offices

Within the range of system sizes from 12 to 366, the diversification of administrative offices was found to be relatively small. The one office that was present in all the systems was that of Secretary-Treasurer. Many of the very small systems either did not have a Superintendent, or they shared a Superintendent with one or more other systems. From system 64 upwards, however, the office of Superintendent was present in all systems without exception.

The first additional offices to appear after those of Secretary-Treasurer and Superintendent were Assistant Secretary-Treasurer, Library Officer, Building and Maintenance Officer, Asst. Superintendent and



NOTE: Mark "x" represents full-time employment; mark "/" represents part-time employment.

FIGURE 2: THE OCCURRENCE OF ADMINISTRATIVE OFFICES IN THE 104 SMALLER SCHOOL SYSTEMS OF THE SAMPLE

Supervisor of Instruction. The first appearance of these offices did not correspond to the order of frequency of occurrence of all offices, nor did these offices show a subsequent regularity of occurrence. After the offices of Secretary-Treasurer and Superintendent the office that followed in frequency of occurrence was that of Building and Maintenance Supervisor; the Assistant Secretary-Treasurer came next; the fifth place in frequency of occurrence was occupied by Asst. Superintendent.

Threshold Sizes of Some Administrative Offices

Superintendent. As mentioned above, many of the very small school systems of the sample either did not have a Superintendent or they shared a Superintendent with one or more other systems. (The office of the Superintendent is a basic office in the organization of Alberta school systems. Even those systems which did not report having a Superintendent of their own, must have had the services of a Superintendent at Large or the Superintendent of a larger system, e.g., of the county or of the division in which the smaller system was situated, to discharge the basic duties of Superintendent for the systems.) The smallest system that reported having its own Superintendent was system 15. Systems 17a, 18a, 20b, 24a and 29a also reported having this office. However it was not evident whether these systems had each a full-time Superintendent. (They did not report, as some other systems did, of sharing the Superintendent with any other system.) Systems 31 to 41, both inclusive, did not report the office. From system 50 upwards all systems except system 56a and 56b reported the office.

Therefore at least from system 50 onwards the office of Superintendent began to appear consistently.

Building and Maintenance Supervisor. The office of the Building and Maintenance Supervisor was the most frequently occurring administrative office after those of Secretary-Treasurer and Superintendent. The office first appeared in system 31, but reappeared only in system 56. Twenty-nine out of the sixty-two school systems of size 56 and above reported this office. This frequency is very close to the definition of consistency of occurrence mentioned at the beginning of this chapter. However, the office of the Building and Maintenance Supervisor began to occur consistently according to the definition only from system 98 upwards.

Assistant Secretary-Treasurer. This office first appeared in system 27 but reappeared only in system 77 and from that size onwards the appearance of the office was quite frequent. Twenty-seven out of the fifty-nine cases reported the office. However, the occurrence of the office became consistent only from system 145 upwards.

Assistant Superintendent. The office of Assistant Superintendent first appeared in system 118. In none of the smaller systems of the sample (the group discussed at present) was any specification of functional area for the Assistant Superintendent. After system 118, the office reappeared in system 141 and occurred consistently from that size onwards.

Supervisor of Instruction. The Supervisor of Instruction seemed to be an office to be examined as such and not just as Supervisor I, for, the office of the Supervisor of Instruction seemed to be much wider in scope than that of a supervisor in a particular subject area. As will be discussed later this office seemed to have functions similar to those of the Assistant Superintendent. The office first appeared as a full-time office as early as in system 29. From system 134 onwards the occurrence of this office became fairly frequent. Taken by itself, i.e., not in combination with Assistant Superintendent, the occurrence of the office became consistent from system 194 onwards.

The Supervisor of Instruction and the Assistant Superintendent. Figure 2 shows that the office of the Supervisor of Instruction and that of the Assistant Superintendent were mutually exclusive in the systems concerned without any exception. This would suggest that these two offices were functionally similar. As a matter of fact system 29 explicitly reported that the titles were interchangeable. There were twenty-one systems which had a Supervisor of Instruction, and seventeen other systems which had an Assistant Superintendent. If these two offices were to be considered as one, all except five of the thirty-one systems of size 134 and above would have this unified office.

Director of Guidance. The office that came next to Supervisor of Instruction in frequency of occurrence was that of Director of Guidance. Thirteen systems in all reported this office. The office first appeared in system 90 and began to occur fairly frequently after

system 164. However, at no range did this office occur in 50 per cent of the cases, and therefore it was not possible to speak of a threshold size for this office.

Subject Supervisor I. Nine systems of the group of small systems reported a Supervisor in a subject area. The occurrence of this office showed concentration towards the upper end (larger systems) of the size scale. Since eight out of the fifteen largest systems of the group reported this office, this office could be said to be occurring consistently from system 186 upwards.

Subject Consultant I. The first Subject Consultant appeared in seven systems of the group. Like that of the first Subject Supervisor, the appearance of this office also was fairly concentrated among the larger systems of the group. The office began to appear consistently at system 231.

Other Offices

Several offices other than those discussed above were present in the group of smaller systems of the sample. Their frequencies of occurrence were too small to justify separate discussion. But the appearance of these offices was important in the sense that they marked the beginnings of offices and departments which evolved to prominence in larger school systems.

Six systems reported an administrative office in the area of elementary education. Five of these systems had a Supervisor of

Elementary Education and the sixth had a Co-ordinator of Elementary Education. (In the four largest systems of the sample, as will be discussed later in this chapter, the department of elementary education was headed by an administrative officer of the rank of director or superintendent.) Occurrence of a Supervisor or Co-ordinator to handle secondary education was fewer than that in the case of elementary education.

A Library Officer was present in six systems and an Accountant appeared in five systems. The occurrence of these offices was very irregular. Three systems had a Purchasing Agent. Systems 306 and 333 reported three or more Subject Consultants while systems 351 and 366 reported three or more Subject Supervisors. An Audio-Visual Supervisor/ Co-ordinator/Consultant appeared in three systems. A second Assistant Superintendent appeared in system 351, and an Administrative Assistant was present in system 333 and 366. A Truant Officer, a Curriculum Materials Assistant, and a Program Assistant appeared in one system each.

The threshold sizes arrived at from the foregoing discussion are listed below against the respective offices. The offices are listed in their order of frequency of occurrence in the school systems of the first part of the sample.

Building and Maintenance Supervisor	98
Assistant Superintendent	141
Assistant Secretary-Treasurer	145
Subject Supervisor I	186
Supervisor of Instruction	194
Subject Consultant I	231

III. THE LARGER SYSTEMS

The four largest systems of the sample are discussed in this section. These were:

System 944
System 1,464
System 3,502
System 3,519

Diversification of Administrative Structure

Diversification of administrative structure was much more marked in these larger systems than in the smaller systems discussed in the first section of this chapter. Departmentalization of administration on the basis of different functional areas of the operation of school systems was a common feature of all the four systems. The patterns of departmentalization, however, were not identical.

The administrative offices which occurred in these four largest systems of the sample are discussed below under headings referring to major functional areas of the administration of school systems. However, a discussion of consistency of occurrence of different offices and a subsequent estimation of their threshold sizes will not be attempted for two reasons. One is that there are not a sufficient number of systems in the group; the other is the existence of a large gap in the sequence of system size between the smallest system of the second group, namely, system 944, and the largest system of the first group, namely, system 366 which immediately preceded system 944 in the sample. Differences related to system size in the occurrence of administrative offices in school systems nonetheless are shown in the discussion that follows.

Superintendents

The office of Superintendent appeared in all the four systems as that of the chief executive.

However, the two largest systems reported offices of Associate Superintendents or of Superintendents of branches. System 3,502 reported two Associate Superintendents, one over the area of instruction and the other over the area of business. System 3,519 reported a Superintendent of Elementary Schools, a Superintendent of Secondary Schools and a Superintendent of Special Education Services. Systems 1,464 and 944 reported only one office by the title of Superintendent, viz., the Superintendent of Schools. System 1,464 reported assistant and deputy superintendents, but system 944 did not have these offices.

Assistant/Deputy Superintendents

Three out of the four systems reported Assistant and/or Deputy Superintendents. System 1,464 had two Assistant Superintendents for elementary and secondary education, and one Deputy Superintendent. System 3,519 had two Assistant Superintendents each for both elementary and secondary schools and one for special education. System 3,502 reported five positions of Assistant Superintendent, one each for elementary and secondary education and others for branches like pupil-personnel services, and facilities and planning. This system reported also one Deputy Superintendent.

The office of Assistant Superintendent had been present in the small systems and had begun to appear consistently from system 141

onwards. Only one of the smaller systems had reported more than one Assistant Superintendent; diversification of this office into the different functional areas, such as elementary education and secondary education, was not noticeable in the group of smaller systems.

Departments of Elementary and Secondary Education

In the group of the smaller systems of the sample a separate office for the supervision of elementary and, to a lesser extent, secondary education had begun to appear. In those systems the officer was called supervisor or co-ordinator of elementary or secondary education.

In the group of larger systems these offices evolved into large departments headed by a superintendent or director(s) and with other additional administrative offices.

System 944 was markedly less evolved than the other systems of this group with respect to departments of elementary and secondary education. This system had a Director of Elementary and Junior High Schools. The system reported also a Director of Education; but the functional area of this office was not further specified. The system had a co-ordinator and several Supervisors both in the elementary and in the secondary areas.

The administrative structure of the departments of elementary and secondary education in systems 1,464, 3,502 and 3,519 are given in Table XVI.

TABLE XVI

ADMINISTRATIVE STRUCTURE OF THE DEPARTMENTS OF ELEMENTARY AND SECONDARY EDUCATION IN SYSTEMS 1,464, 3,502 AND 3,519

System	Dept. of Elem. Education	Dept. of Sec. Education
1,464	Asst. Supt. - Elementary	Asst. Supt. - Secondary
	Director of Elem. Instruction	Director of Sec. Instruction
	Asst. Dir. of Elem. Instruction	Asst. Dir. of Sec. Instruction
		Director of Vocational Education
	(Director of Religious Education)	(Director of Religious Education)
	Supervisors, Consultants	Supervisors, Consultants
3,502	Asst. Supt. of Elementary Education	Asst. Supt. of Secondary Education
	Director, Division I	Director, Senior High Schools
	Director, Division II	Director, Secondary Curriculum
	Director, Elementary Curriculum	Director, Junior High School Administration
	Supervisors, Asst. Supervisors	Director, Junior High School Instruction
		Director, Vocational Education
		Supervisors, Asst. Supervisors
3,519	Supt. of Elementary Schools	Supt. of Secondary Schools
	Asst. Supt. of Elementary Schools - North Zone	Asst. Supt. of Secondary Schools
	Asst. Supt. of Elementary Schools - South Zone	Asst. Supt. of Secondary Schools
	Asst. Supt. of Elementary Schools - West Zone	Administrative Asst. to Supt. of Secondary Schools
	Director of Elementary School Program	Supervisors, Asst. Supervisors
	Administrative Asst. to Supt. of Elementary Schools	
	Supervisory Asst., Div. I & II	
	Supervisory Consultants, Div. I & II	
	Supervisors, Consultants	

A Director of Elementary and Junior High Schools appeared in system 944 for the first time in the sample. An Assistant Superintendent each over elementary and secondary education appeared first in system 1,464. Separate directorates for elementary and secondary education also appeared first in system 1,464. System 3,502 had still other new offices in these departments, viz., Director of Curriculum, Director of Administration, etc. Only in the largest system of the sample were additional Superintendents in charge of the departments of elementary and secondary schools.

Subject Supervisors and Subject Consultants

Subject Supervisor I and Subject Consultant I had begun to appear consistently in systems 186 and 231 respectively.

In the four largest systems of the sample there was, in general, a large increase in the number of Subject Supervisors and Consultants. System 3,502 was an exception in the sense that it did not have the office of Subject Consultants. The tendency of appointing supervisors and consultants for more and more subject areas had been discernible even in the larger systems of the first part of the sample. System 351, for example had reported two Music Supervisors, one Art Supervisor and one Physical Education Supervisor; system 306 had a consultant each for band, music, art and reading. The data from the four systems of the second part of the sample showed that as system size increased the number of individual areas over which Supervisors and/or Consultants were appointed also increased. Besides, the number of administrative

personnel appointed in each area also showed increase.

The functional areas of Subject Supervisors and Consultants and their number in each area in systems 944, 1,464, 3,502 and 3,519 are given in Table XVII. An examination of the table indicates that the large increase in the number of Supervisors and Consultants was due to the large diversification of the instructional areas served by the school systems. System 3,519, for example, had twenty-one Supervisors over areas like music, art, drama, physical education, home economics, industrial arts, business education, etc.

Pupil Personnel Services, Special Education and Guidance

An administrative officer to handle guidance and/or special education began to appear from system 90 onwards. As was mentioned earlier, in the smaller systems this officer was variously called director, supervisor or co-ordinator.

The four large systems of the second part of the sample, in general, had a department or a set of offices which provided a number of services in the areas of guidance, special education and pupil personnel services. (In the smaller systems all these services were handled by a single officer.) As the department became more and more elaborate it came to be headed by an officer of high administrative rank. In system 3,519, for instance, the department was headed by a Superintendent, Special Educational Services. Administrative offices in the areas of guidance, special education and pupil personnel service, in the four large systems are listed below.

System 944	Co-ordinator of Pupil Personnel Services Supervisor of Special Education
System 1,464	Director, Pupil Personnel Services Supervisor of Guidance Supervisor of Special Education
System 3,502	Assistant Superintendent of Pupil Personnel Services Director, Counselling Services Director, Special Education Director, Bureau of Child Study Assistant Director, Bureau of Child Study
System 3,519	Superintendent, Special Educational Services Assistant Superintendent, Special Educational Services Supervisor of Guidance Assistant Supervisor of Guidance Supervisor of Special Education Supervisor, Learning Assistance Centre

Audio-Visual Supervisor

Among the smaller systems system 89 had reported an Audio-Visual Co-ordinator; system 243 had reported a Director of Educational TV. All the four largest systems had one or more administrative officers in this area. System 944 reported an Instructional Material Supervisor and an Educational TV Consultant; system 1,464 reported an A/V Consultant; system 3,502 had one A/V Supervisor; and system 3,519 reported one Supervisor, A/V Aids, one Co-ordinator, A/V Centre and two A/V Aids Consultants.

Library Supervisor

Six of the group of smaller systems of the sample had reported a library officer for the system. Three out of the four largest systems of the sample reported one or more Library Supervisor(s).

TABLE XVII

FUNCTIONAL AREAS OF SUBJECT SUPERVISORS AND CONSULTANTS AND THEIR NUMBER IN EACH AREA, IN THE FOUR LARGEST SCHOOL SYSTEMS OF THE SAMPLE

System	Supervisors	Consultants
944	Music (1); Phys. Educ. (1); Oral French (1); Religious Educ. (1); Teacher Orientation (1)	Art (1); Industrial Arts (1); Home Econ. (1); Music (1); Materials (1)
1,464	Art (1); Ind. Arts Voc. Educ. (1); Phys. Educ. (2); Relig. Educ. (2); Social Studies (1); Music (2)	Business Educ. (1); Bilingual Program (1); Relig. Educ. (2); Science (1)
3,502	Music (3); Art (2); Drama (1); Phys. Educ. (4); Home Econ. (1); Indust. Arts (1); Vocational Educ. (1); Business Educ. (1); Language (1); Extension Services (1)	
3,519	El. French (1); El. Reading (1); Music (5); Art (2); Phys. Educ. (4) Home Econ. (1); Indust; Arts (1); Vocational Educ. (1); Business Educ. (1); French (1); Mathematics (1); English (1):	El. French (2); Art (4); El. Reading (1); Music (3); Phys. Educ. (1); Voc. Educ. (1); Reading (1); Maths (4); Science (1); Eng. (1); Social Studies (1).

NOTE: The numbers in brackets represent the number of personnel in the area.

Business Management

It was noted earlier that the office of the Secretary-Treasurer occurred in all the school systems of the sample without exception. An Assistant Secretary-Treasurer began to appear quite frequently from system 77 onwards. An Accountant appeared irregularly in the smaller systems of the sample; a few of these smaller systems reported a Purchasing Agent.

The four largest systems of the sample each reported at least four business management offices. System 3,502 had several business management offices not reported by the other systems.

The business management offices in the four largest systems of the sample are listed below.

System 944	Secretary-Treasurer
	First Accountant
	Second Accountant
	Purchasing Agent
System 1,464	Secretary-Treasurer
	Assistant Secretary-Treasurer
	Assistant Secretary-Treasurer
	Purchasing Agent
System 3,502	Secretary-Treasurer
	Deputy Treasurer
	Deputy Secretary
	Purchasing Agent
	Purchasing Agent
	Buyer
	Buyer
	Purchase Planner
	Requisition Control
	Director, Accounting & Budget
	Director, Purchasing & Stores
	Payroll Supervisor

System 3,519
- Secretary-Treasurer
- Assistant Secretary-Treasurer
- Assistant Treasurer
- Accountant
- Purchasing Agent
- Assistant Purchasing Agent

Building and Maintenance Department

In the group of the smaller systems of the sample an administrative office handling building and/or maintenance was the most frequently occurring office after those of Secretary-Treasurer and School Superintendent.

The data from the group of large systems in the sample show that the number and administrative rank of the officers of the building and maintenance department increased as the systems grew larger in size.

The administrative offices in the department of building and maintenance in the four largest systems of the sample are given below.

System 944
- Director of Buildings and Maintenance
- Construction Co-ordinator

System 1,464
- Supervisor of Maintenance
- Building Inspector
- Supervisor of Properties and Maintenance

System 3,502
- Assistant Superintendent of Facilities and Planning
- Director of Planning
- Director of Construction
- Director of Design
- Director of Maintenance and Operation
- Assistant Director of Maintenance and Operation
- Facilities and Maintenance Co-ordinators (eleven)

System 3,519
- Superintendent of Architecture and Building
- Co-ordinator of Design
- Mechanical Engineer
- Building Inspectors (three)
- Supervisor of Maintenance
- Mechanical Supervisor
- Structural Supervisor

Personnel Department

Three of the four largest school systems of the sample reported several personnel offices. No office of this kind was present in the smaller systems of the sample. The offices of the personnel departments of the three largest systems are given below.

System 1,464	Director, Teacher Recruitment Director, Maintenance and Clerical Personnel Personnel Officers (two)
System 3,502	Assistant Superintendent - Personnel Director of Personnel - Instructional Director of Personnel - Business Personnel Officers (two)
System 3,519	Director, Personnel Division Personnel Officers (four) Assistant Personnel Officers (two)

Data Processing Department

A data or information processing department (with access to computers) was a feature of the three largest school systems of the sample. System 3,502 reported the largest number of personnel in this department. The systems and the officers in their data processing departments are given below.

System 1,464	Co-ordinator of Data Processing Administrative Assistant - Data Processing
System 3,502	Director of Information Systems Manager of Computer Operations Programmer/Analysts (five)
System 3,519	Manager of Department of Data Processing Programmer/Analysts (two)

Other Offices

The offices which were reported by one or more of the four largest systems of the sample but which were too varied and irregular for classification and discussion are listed below.

System 944	Research Assistant Supervisor of Teacher Orientation
System 3,502	Warehouse Manager Assistant Warehouse Manager Equipment Technologist
System 3,519	Director of Auxiliary Services Planning Officer (Auxiliary Services) Information Officers (three)

Summary of Findings

An examination of the relationship between the occurrence of particular administrative offices and the sizes of school systems in the sample was carried out in this chapter.

From a study of the data on 104 smaller school systems constituting the first part of the sample, threshold sizes of six administrative offices were arrived at. These offices were: Building and Maintenance Supervisor, Assistant Secretary-Treasurer, Supervisor of Instruction, Assistant Superintendent, Subject Supervisor I, and Subject Consultant I.

There were other offices for which threshold sizes could not be estimated owing to the infrequency or irregularity of their occurrence in the systems of the first part of the sample.

The second part of the sample was constituted of four large systems. The administrative departments of the systems with the offices

that constituted those departments were examined. Although useful information on the evolution of those departments came out from this examination, estimation of threshold sizes of the administrative offices was not possible. The main reason for this was that there were too few school systems in the second part of the sample to justify such estimation.

A very large number of the school systems in the sample were of relatively small size. The number and diversity of administrative offices in a majority of school systems of the sample were, therefore, small. There was a wide gap in the sequence of sizes between the largest system of the first part of the sample and the smallest system of the second part of the sample. The second part consisted of only four large school systems. These were the reasons why the threshold sizes of only a few administrative offices could be estimated in this study. These limitations of the sample were unavoidable because Alberta has a large majority of small and medium sized school systems plus four large ones.

One benefit of the examination of the occurrence of administrative offices in small school systems as reported here may be that light has been thrown on the very first beginning of many of these administrative offices. For example, Gill reported (1:55) that the office of the superintendent was found in all the school systems of his sample. This study, however, found that the office of the superintendent began to occur frequently only at a system size of 50. Again, this study has shown that a single Supervisor of Instruction/ Assistant Superintendent

represented the first beginnings of the departments of elementary and secondary education present in larger school systems.

Comparison with the Findings of Gill

Comparison between the threshold sizes found by Gill (1:91,92) and those arrived at in the present study can be made only in very few cases. It must be said that in these few cases the findings of this study differ considerably from those of Gill. For example, the threshold size for the first office in the department of Building Construction and Maintenance as found by Gill was 327. This study found that a Building and Maintenance Supervisor began to appear consistently in the present sample from system 98 onwards. In this study the office of the Assistant Superintendent began to appear consistently at system size 141; the threshold size for this office as found by Gill was 699 to 1,026.

The predominance of small systems in the sample probably had something to do with the lowering of threshold sizes. (It may happen that a particular office occurring fairly frequently through a large range of system size may meet the arbitrary criterion of "consistent" occurrence at different sizes in two different samples, depending upon the particular sizes of systems constituting the samples.) The threshold size of the first Supervisor was much higher in the present sample than in Gill's sample. However, if the unified office of the Supervisor of Instruction and the Assistant Superintendent (as discussed on pages 84-85) were to be considered as the office of the first

Supervisor, the threshold size of this unified office in the present sample might be very close to the threshold size for the first (and second) Supervisor as found by Gill.

Conclusion

A general relationship between occurrence of administrative offices and the size of school systems was discernible in an examination of the data as presented in Figure 2. However, the number of threshold sizes arrived at in this study did not seem to be sufficient to establish the existence of this relationship in the sample.

REFERENCE FOR CHAPTER V

(1) Gill, Norman. "The Relationship between the Size of Urban School Systems in Western Canada and Certain Characteristics of Their Administrative Staffs." Unpublished Master's thesis, The University of Alberta, Edmonton, 1967.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The Problems

One purpose of the present study was to investigate the change in administrative ratio in school systems in relation to increase of the size of the systems. The relationship between the appearance of new administrative offices and system size also was examined. Two hypotheses were formulated and tested.

Hypothesis I was: Administrative ratio in school systems decreases as the size of the system increases. Hypothesis II was: When school systems are ranked in the order of their sizes, and their administrative staff listed, each administrative office begins to occur consistently at a specific size of school system. This specific system size was called the threshold size for the particular office.

Investigation of the Problems

The sample chosen for the study was all the available school systems in the Province of Alberta. These could be called a population as far as Alberta was concerned. The final sample consisted of 108 school systems. Pertinent data from the school systems were collected by means of questionnaires.

Four definitions of administrative component, and three definitions of system size were used. These gave twelve definitions of administrative ratio.

Pearson product-moment correlations between each administrative ratio and the corresponding system size were obtained. The systems were grouped into four groups of very small, small, medium and large systems, and the mean administrative ratios in these different groups were computed. A one-predictor model of multiple regression analysis, with administrative ratio as criterion and system size (employee size) as predictor, was applied to the data. A graph representing the relationship between administrative ratio and system size was prepared and a line of best fit, based on the results of the regression analysis, was drawn.

Further, a three-predictor model of multiple regression analysis with administrative ratio as criterion and the three size variables, employee size, student size and location size, as three predictors was applied to the data.

The administrative offices reported by the school systems were listed and categorized on the basis of functional similarity. A tabulation was made representing both the school systems in their order of size and the administrative offices in these systems in their order of frequency of appearance in the sample. Threshold sizes of several administrative offices were estimated by a frequency count based on the above representation.

Findings of the Study

All the twelve cases examined showed negative Pearson product-moment correlation between administrative ratio and system size in the sample. Eight of these twelve cases of correlation were significant

at or below the 0.05 level. All the four cases to which the one-predictor model multiple regression analysis was applied gave negative regression weights, significant at the 0.001 level, to the size variable used as predictor of administrative ratio. Mean administrative ratios in groups of smaller systems were, in general, higher than those in groups of larger systems.

On such evidence, hypothesis I was accepted. That is, the study found that administrative ratio in school systems decreased as system size increased.

However, in the three-predictor regression analysis, where employee size, student size and location size were used simultaneously as three predictors of administrative ratio, all the significant regression weights of employee size were positive, all the significant regression weights of student size were negative, and the significant regression weights of location size were equally divided between positive and negative. This meant that when influences of changes in student size and location size were controlled for, an increase in the employee size gave an increase in administrative ratio in the sample; on the other hand, when influences of changes in employee size and location size were controlled for, an increase in student size gave a decrease in administrative ratio in the sample. No such conclusion regarding the relationship between location size and administrative ratio could be drawn from the findings of the study.

The contradiction between acceptance of hypothesis I and the findings from the three-predictor model of multiple regression analysis

mentioned above is only an apparent one. The latter findings deal with the contributions of the three size variables independent of one another. Therefore, these findings were accepted as further information on the nature of the independent contributions of the different aspects of system size toward administrative ratio.

Only very limited evidence for the acceptance of hypothesis II was forthcoming from this study. Threshold sizes of only six administrative offices could be estimated from the sample. The frequencies of occurrence of many other administrative offices reported by school systems were not large enough in the sample to render estimation of their threshold sizes possible.

Comparison of the Findings with Those of Other Studies

Reference was made in the review of literature (Chapter II) to the findings of some of the earlier studies on administrative ratio and system size. All except one (Terrien and Mills) of these studies found that administrative ratio decreased as system size increased. The findings of the present study, on the whole, agree with this conclusion.

This study was undertaken partly in order to supplement the information provided by Gill's study. Gill concluded that the school administrator in the four western provinces of Canada could expect a decrease in administrative ratio as the system grew in size. The findings of the present study provide supportive evidence of this conclusion by Gill. For, the present study also found that, in a sample including most of the school systems in the Province of Alberta,

the larger school systems generally had lower administrative ratios than did the smaller systems. However, as discussed above, the present study has further found a differentiation in the contributions of the different aspects of system size toward administrative ratio.

In the one other study on a sample of school systems, Terrien and Mills reached the conclusion that the proportion of administrative staff was higher in larger school systems. Terrien and Mills obtained this finding by grouping school systems into groups of small, medium and large systems and computing the mean percentage of administrative component in each group. In this sense the present study does not provide supportive evidence to the conclusion of Terrien and Mills. On the other hand, in a similar analysis this study found that groups of larger school systems, in general, had lower mean administrative ratios. It was in the examination of the independent contribution of employee size toward administrative ratio (which Terrien and Mills do not seem to have done) that this study found a positive direction of dependence of administrative ratio on employee size.

Anderson and Warkov have suggested that the relative size of administrative component in organizations may show increase as the number of places at which the services of an organization are performed increases. The finding of the present study on this point was inconclusive. In the sample studied, location size failed to show significant correlation to administrative ratios. When location size was used together with employee size and student size in a three-predictor model of multiple regression analysis to predict

administrative ratio, the significant regression weights of location size were equally divided between positive and negative. The negative regression weights tended either to be statistically insignicant, or to be definitely smaller than the positive ones. Although no conclusions can be drawn from such results, the point surely seems to be worthy of further examination. For, if the independent contribution of location size turns out to be in the positive direction, an increase in system size heavy on the location aspect of it is likely to increase the administrative ratio as Anderson and Warkov have suggested.

Implications of the Findings

One of the findings of the study that has implications for the organization of school systems is that larger systems, in general, have lower administrative ratios. Several probable inferences may be made from this finding. As Litterer has suggested there are advantages of scale in the managerial area as in areas of production and finance. Probably increased size enables managerial hierarchy to take on efficient forms. Larger size probably makes efficient specialization possible. Duplication of efforts is avoided and utilization of the full capacity of the administrative staff employed is made possible by increase in size. In any case, the belief, as Caplow refers to, that the administrative components of organizations increase out of proportion to increase in the size of the organizations is contradicted by the findings of this study.

However, if the independent contribution of increase in employee

size toward administrative ratio is positive, as this study has found, what is this due to? Litterer's suggestion that increase in organizational size is usually accompanied by a larger span of control of supervisors is not supported by this finding. An increase in bureaucratization as the number of employees increases may not be ruled out.

Recommendations for Further Study

The present study seems to be the only one of its kind that has investigated the independent contributions of the different aspects of system size toward administrative ratio. Further studies along this line on other samples may bring useful information.

Initially this study proposed to consider a definition of administrative component including not only administrators but also the clerical and secretarial staff who help the administrators. This definition had to be abandoned on account of the practical difficulty encountered in accurately separating the administrative support staff from nonadministrative support staff. However, such separation did not seem impossible. An examination of the relative size of this component and its change in relation to changes in system size may bring supplementary information in the area of the present study.

No conclusions could be reached in the present study regarding the independent contribution of location size toward administrative ratio. A more conclusive study of this aspect of the problem may be quite useful for theory and practice in the area examined in this study.

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APPENDIX A

INSTRUMENTS USED FOR COLLECTING DATA

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL
ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON, CANADA

February 17, 1969

Your cooperation is requested in a University of Alberta study of the organization and development of administrative, supervisory and supportive staff in 137 school systems in Alberta. This study has financial support from the Alberta Adivsory Committee for Educational Studies.

The obtained information should allow generalizations to be made about the changes in various administrative ratios as school systems change in size, and therefore will be of considerable interest to all school systems. In addition, the sizes of school systems at which specific administrative posts begin to appear consistently will be examined.

Owing to the variation in the number and names of administrative positions in different school systems a check list is not provided, but the following list will serve as a guide in compiling the numbers of various categories of your staff.

Superintendents, Assistant Superintendents,

Secretary-Treasurers, Accountants,

Directors of Branches, Assistant Directors,

Registrars,

Supervisors, Subject Consultants, Advisors,

Program and/or Curriculum Officers/Assistants/Supervisors,

Research and Development Officers and Assistants,

Library Officers,

Staffing Officers,

Legal Officers, School Architects and Engineers,

Building and Maintenance Supervisors, Purchasing Agents,

Principals, Vice Principals,

*DO NOT INCLUDE DEPARTMENTS OF TRANSPORTATION OR CAFETERIA

Your reply will be kept anonymous and the report will not identify individuals or school systems. A report will be sent from this Department to all participating school systems.

A stamped addressed envelope is enclosed.

DATA ON SCHOOL SYSTEM

NAME OF SCHOOL SYSTEM .....

PART I. SIZE OF SCHOOL SYSTEM: NUMBER AND TYPES OF SCHOOLS, NUMBER OF NONADMINISTRATIVE PERSONNEL, AND NUMBER OF PUPILS IN THE SYSTEM, 1968-69.

Note: Please fill in the information for your school system in the right hand column, against items indicated in the left hand column.

DESCRIPTION OF INFORMATION	NUMBER
Total Number of Schools in the System	
Elementary Schools	
Junior High Schools	
Senior High Schools	
Elementary-Junior High Schools	
Junior H.S.-Senior High Schools	
Elementary-Junior H.S.-Senior H.S.	
Other Schools, Specify	
Other Schools, Specify	
*Total Number of Teachers in the System	
*Total Number of Psychologists, Guidance and Welfare Officers, Visiting Teachers, and Specialists	
*Total Number of Personnel (except Clerical & Secretarial Staff) Employed in Library, Store Equipment and Maintenance.	
*Total Number of Clerical and Secretarial Staff Employed in the Central Office	
*Total Number of Clerical and Secretarial Staff Employed in Schools	
*Total Number of Pupils in the System	

*Please include full-time equivalents of any part-time employees

PART II. THE ADMINISTRATIVE COMPONENT, 1968-69

Note: Please list the administrative and supervisory positions in the school system in the left hand column, and give the number of people in each position in the right hand column.

NAME OF POSITION	NUMBER OF PEOPLE
e.g. Superintendent	
Secretary-Treasurer	

PART II (cont'd): ADMINISTRATIVE AND SUPERVISORY PERSONNEL IN THE SYSTEM

PART II (Cont'd): ADMINISTRATIVE AND SUPERVISORY PERSONNEL IN THE SYSTEM

PART III

Note: Your answers to the two questions that follow are necessary to divide the clerical and secretarial staff in the system into those who help at administrative tasks, and those who help at nonadministrative tasks.

Please indicate on the scale:

1) What approximate percentage of the clerical and secretarial work at the central office is devoted to helping nonadministrative/nonsupervisory personnel, e.g. psychologists?

---

0 10 20 30 40 50 60 70 80 90 100%

2) What approximate percentage of the clerical and secretarial work in schools is devoted to helping the work of teachers and other non-administrative personnel?

---

0 10 20 30 40 50 60 70 80 90 100%

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL
ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON, CANADA

Your school system was recently asked to provide our Department with data for a longitudinal study of the development of administrative and supervisory staffs in school systems.

A cross-sectional aspect of the same study involving 137 Alberta systems is investigating the development of their total administrative components. This study has the financial support of the Alberta Advisory Committee for Educational Studies.

Besides using the information already requested we require some additional data, and again are asking for your cooperation. Would you please complete the enclosed tables and return them in the stamped addressed envelope.

Your reply will be kept anonymous and the report will not identify individuals or school systems. A report will be sent from this Department to all participating school systems.

Yours sincerely.

DATA ON SCHOOL SYSTEM, 1968-69

NAME OF SCHOOL SYSTEM .....

Note: Please fill in the information for your school system in the right hand column, against items indicated in the left hand column.

DESCRIPTION OF INFORMATION	NUMBER
Total Number of Schools in the System	
Elememtary Schools	
Junior High Schools	
Senior High Schools	
Elementary-Junior High Schools	
Junior High-Senior High Schools	
Elementary-Junior High-Senior High Schools	
Other Schools, Specify	
Other Schools, Specify	
*Total Number of Personnel (except Clerical and Secretarial staff) Employed in Library, Store, Equipment, and Maintenance.	
*Total Number of Clerical and Secretarial Staff Employed in the Central Office	
*Total Number of Clerical and Secretarial Staff Employed in Schools	

*Please include full-time equivalents of any part-time employees.

ANSWERS TO THE FOLLOWING TWO QUESTIONS ARE NECESSARY TO DIVIDE CLERICAL AND SECRETARIAL STAFF INTO ADMINISTRATIVE/NONADMINISTRATIVE CATEGORIES.

1. What approximate percentage of the clerical and secretarial work at the central office is devoted to helping the work of nonadministrative/nonsupervisory personnel, e.g. psychologists?

---

0 10 20 30 40 50 60 70 80 90 100%

2. What approximate percentage of the clerical and secretarial work in schools is devoted to helping the work of teachers and other nonadministrative personnel?

---

0 10 20 30 40 50 60 70 80 90 100%

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL
ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON, CANADA

March 18, 1969

On February 17 we requested certain information regarding your school system for use in our study of the administrative proportion in Alberta school systems. To date no reply has been received from your system and we would like to include your information in the study.

Because the study is intended to provide a realistic analysis of the situation in Alberta, information from all systems is essential. A report of the findings will be sent to all cooperating school systems.

Would you therefore please soon complete the questionnaire and mail it in the stamped addressed envelope which was enclosed.

Thank you for your cooperation.

Yours sincerely,

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL
ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON, CANADA

April 1, 1969

We have recently requested that you supply certain information concerning your school system as part of an overall study of the administrative proportion of school jurisdictions in Alberta.

As we have not yet received a reply to our March 18 letter, we felt that you may have displaced the original questionnaire. Therefore another has been included and your prompt completion and return would be greatly appreciated.

Yours sincerely,

APPENDIX B

ADDITIONAL TABLES

TABLE XVIII

ADMINISTRATIVE COMPONENTS OF CITY SCHOOL DISTRICTS

System identification number	Principals (1)	Vice-principals (2)	Central office prof. staff (3)	Central office admin. staff = Admin. component I (4)	Administrative component II (1) + (4)	Administrative component III (1) + (2) + (4)	Administrative component IV (1)+(2)+(3)+(4)
101	135	153	34	96	231	384	418
102	157	231	45	134	291	522	567
103	15	18	1	11	26	44	45
104	15	16	2	10	25	41	43
105	18	16	3	12	30	56	49
106	4	2	0	6	10	12	12
107	5	3	0	3	8	11	11
108	3	9	1	2	5	14	15
109	7	7	0	3	10	17	17
110	52	38	14	36	88	126	140
111	72	71	6	34	106	175	183
112	6	7	0	5	11	18	18
113	1	1	0	1	2	3	3
114	6	3	0	2	8	11	11
115	7	4	0	5	12	16	16
116	1	1	0	1	2	3	3
117	4	2	0	3	7	9	9
118	2	1	0	3	5	6	6
119	2	1	0	1	3	4	4

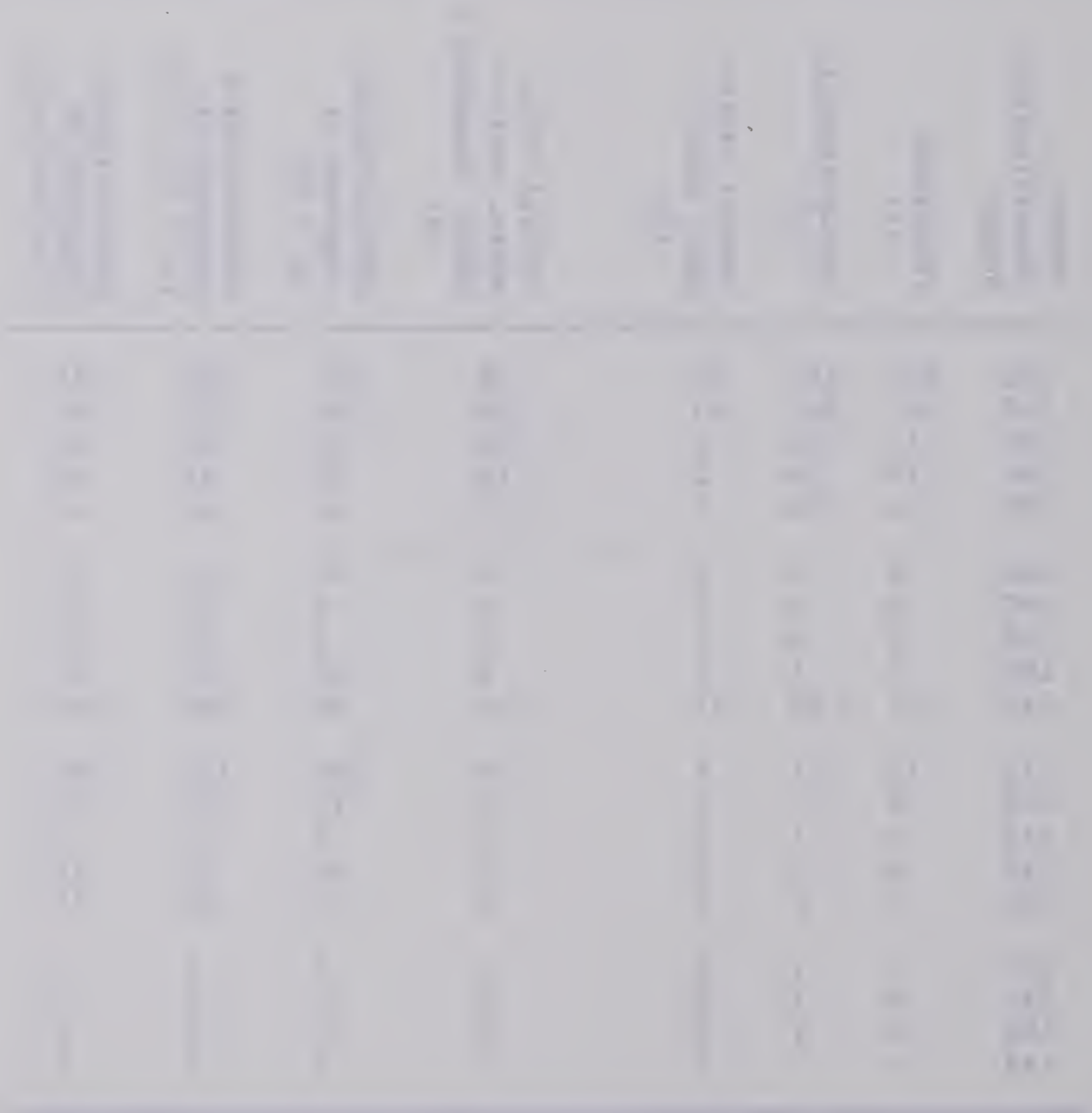


TABLE XIX

ADMINISTRATIVE COMPONENTS OF TOWN SCHOOL DISTRICTS

System identification number	Principals (1)	Vice principals (2)	Central office professional staff (3)	Central office admin. staff = Admin. component I (4)	Administrative component II (1) + (4)	Administrative component III (1)+(2)+(4)	Administrative component IV (1)+(2)+(3)+(4)
201	2	1	1	2	4	5	6
202	2	2	0	2	4	6	6
203	2	2	0	2	4	6	6
204	3	3	1	2	5	8	9
205	1	1	0	2	3	4	4
206	1	1	0	1	2	3	3
207	3	3	0	1	4	7	7
208	1	1	0	1	2	3	3
209	1	2	0	1	2	4	4
210	1	2	0	1	2	4	4
211	1	0	0	2	3	3	3
212	1	2	0	1	2	4	4
213	2	2	0	1	3	5	5
214	1	2	0	1	2	4	4
215	1	1	0	1	2	3	3
216	2	1	0	1	3	4	4
217	2	1	1	1	3	4	5
218	1	1	0	1	2	3	3
219	1	1	0	1	2	3	3
220	1	1	0	1	2	3	3
221	1	0	0	1	2	2	2
222	1	1	0	2	3	4	4
223	1	2	0	3	4	6	6
224	1	1	0	1	2	3	3
225	1	1	0	1	2	3	3
226	1	1	0	1	2	3	3
227	1	1	0	1	2	3	3
228	1	1	0	2	3	4	4
229	1	1	0	2	3	4	4
230	3	4	1	3	6	10	11
231	4	5	5	3	7	12	17
232	5	5	0	5	10	15	15

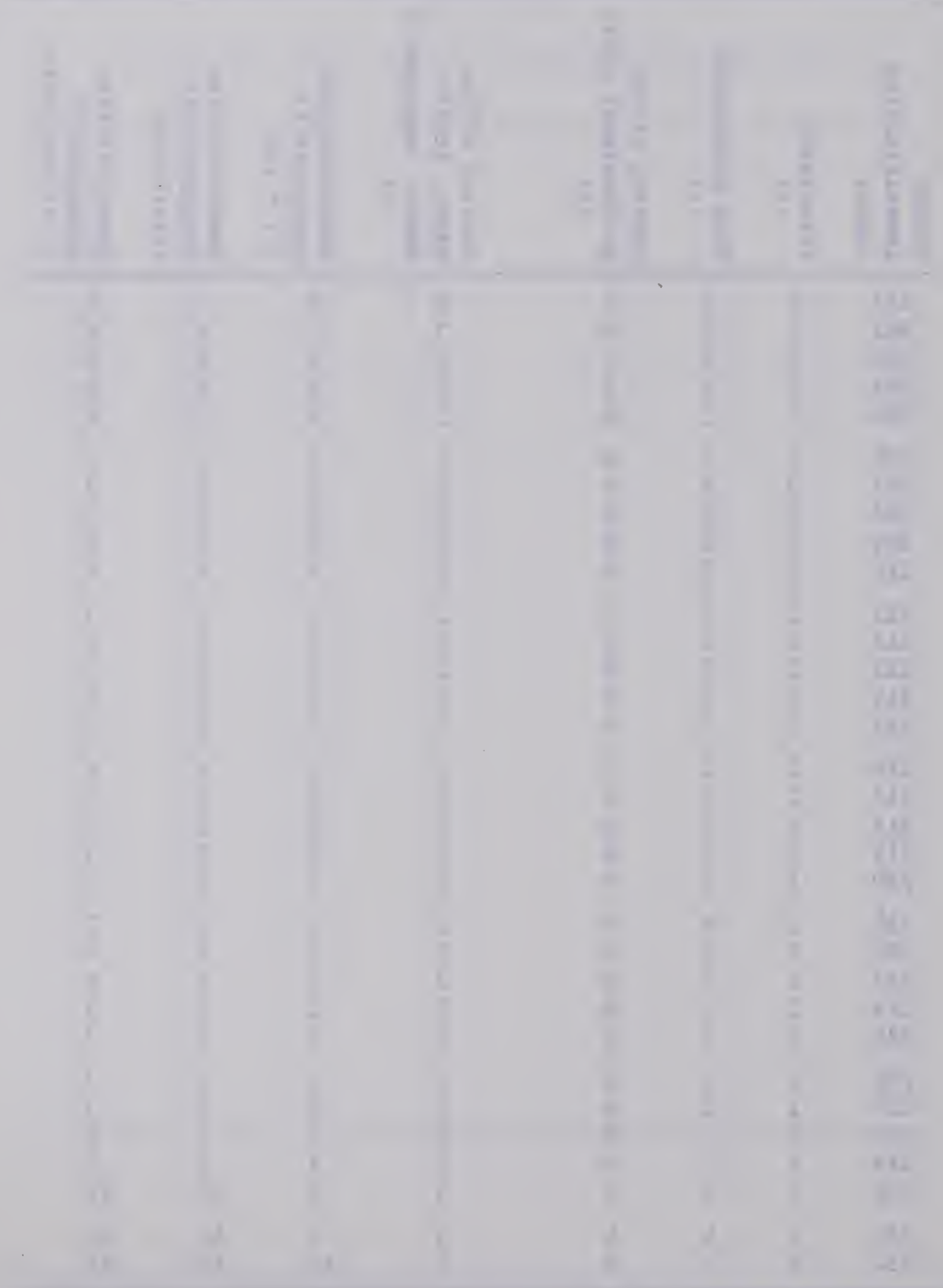


TABLE XX

ADMINISTRATIVE COMPONENTS OF RURAL SCHOOL DISTRICTS

System identification number	Principals (1)	Vice principals (2)	Central office professional staff (3)	Central office admin. staff = Admin. component I (4)	Administrative component II (1) + (4)	Administrative component III (1)+(2)+(4)	Administrative component IV (1)+(2)+(3)+(4)
301	2	2	0	1	3	5	5
302	1	2	0	2	3	5	5
303	2	2	0	1	3	5	5
304	2	2	0	1	3	5	5

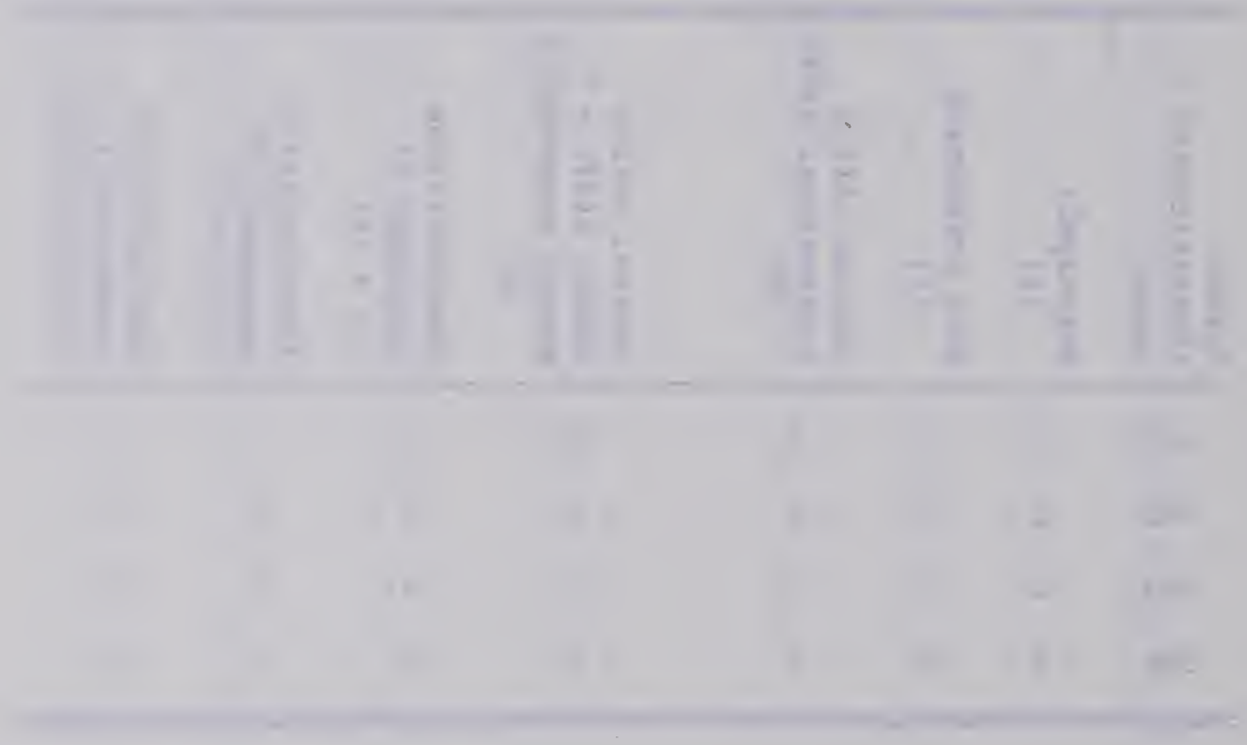


TABLE XXI

ADMINISTRATIVE COMPONENTS OF SCHOOL DIVISIONS

System identification number	Principals (1)	Vice principals (2)	Central office professional staff (3)	Central office admin. staff = Admin. component I (4)	Administrative component II (1) + (4)	Administrative component III (1)+(2)+(4)	Administrative component IV (1)+(2)+(3)+(4)
401	8	5	0	3	11	16	16
402	2	1	0	2	4	5	5
403	9	8	0	4	13	21	21
404	13	9	2	3	16	25	27
405	8	8	1	4	12	20	21
406	7	3	0	2	9	12	12
407	7	3	1	4	11	14	15
408	7	4	1	3	10	14	15
409	7	7	0	3	10	17	17
410	11	11	1	4	15	26	27
411	6	5	1	3	9	14	15
412	14	11	2	5	19	30	32
413	8	5	0	6	14	19	19
414	8	3	2	4	12	15	17
415	3	3	0	2	5	8	8
416	34	7	2	6	40	47	49
417	14	9	1	4	18	27	28
418	3	5	3	2	5	10	13
419	7	2	0	2	9	11	11
420	7	7	0	3	10	17	17
421	8	2	1	2	10	12	13
422	3	1	1	2	5	6	7
423	11	9	1	5	16	25	26
424	14	8	3	6	20	28	31
425	7	9	0	4	11	20	20
426	7	10	1	3	10	20	21

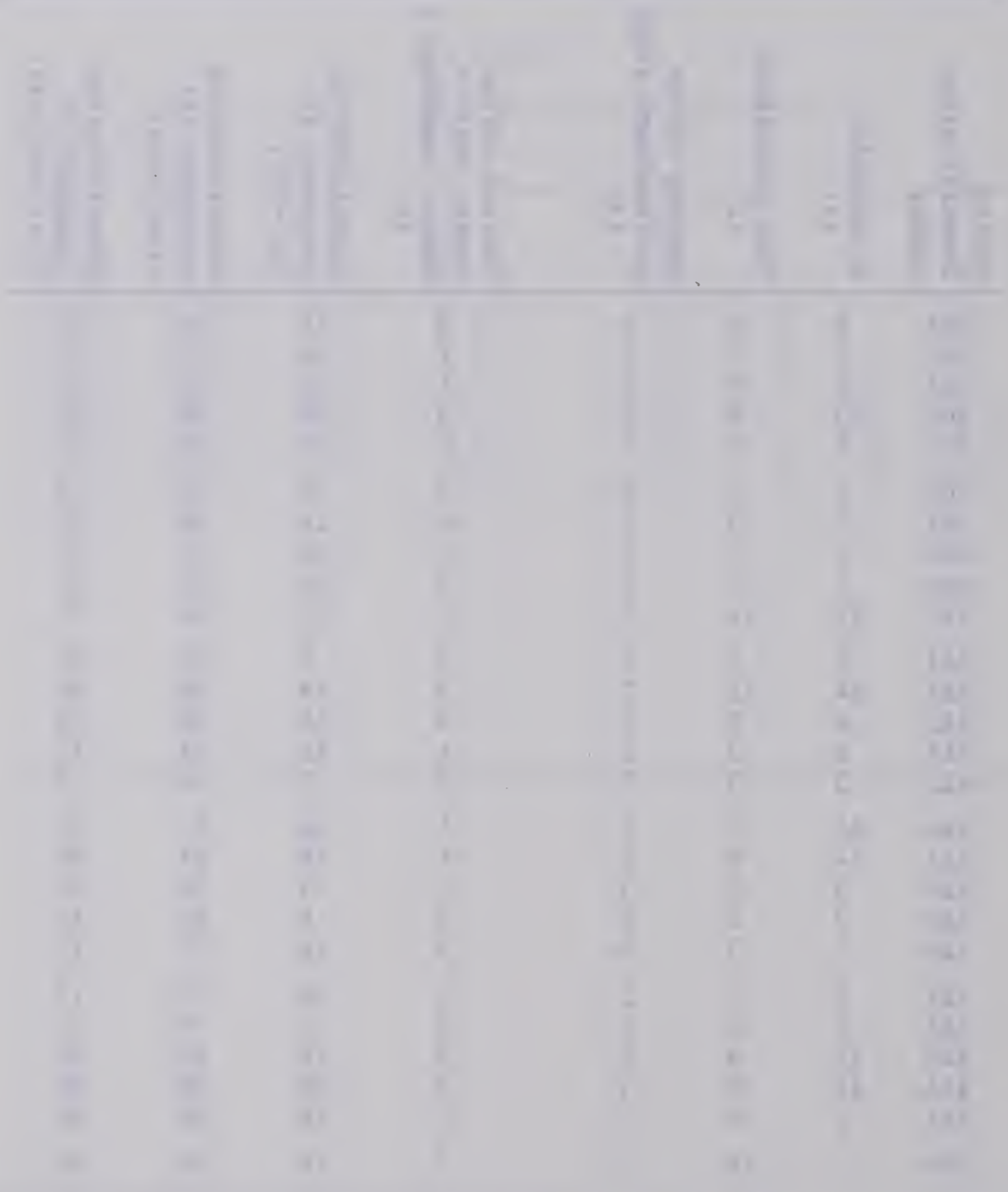


TABLE XXII

ADMINISTRATIVE COMPONENTS OF COUNTY SCHOOL SYSTEMS

System identification number	Principals (1)	Vice principals (2)	Central office professional staff (3)	Central office admin. staff = Admin. component I (4)	Administrative component II (1) + (4)	Administrative component III (1)+(2)+(4)	Administrative component IV (1)+(2)+(3)+(4)
501	8	7	0	4	12	19	19
502	12	3	1	4	16	19	20
503	6	5	1	5	11	16	17
504	12	8	1	4	16	24	25
505	7	6	8	3	10	16	24
506	11	8	1	5	16	24	25
507	9	7	1	5	14	21	22
508	11	14	3	9	20	34	37
509	6	7	0	3	9	16	16
510	21	15	4	6	27	42	46
511	13	7	2	6	19	26	28
512	11	8	6	8	19	27	33
513	9	7	1	6	15	22	23
514	4	4	0	3	7	11	11
515	10	11	5	6	16	27	32
516	10	17	7	9	19	36	43
517	7	6	0	3	10	16	16
518	5	4	1	4	9	13	14
519	8	4	0	3	11	15	15
520	20	19	8	9	29	48	56
521	5	5	1	4	9	14	15
522	6	6	0	3	9	15	15
523	16	8	3	6	22	30	33
524	9	7	1	3	12	19	20
525	10	6	1	5	15	21	22
526	11	8	0	3	14	22	22
527	9	6	2	3	12	18	20

TABLE XXIII

ADMINISTRATIVE RATIOS I, II AND III OF CITY SCHOOL DISTRICT

System identification number	Administrative component I (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio I (1)x100/(2)	Administrative ratio II (1) x1000/(3)	Administrative ratio III (1)/(4)
102	134	3,519	72,344	181	3.81	1.85	0.74
101	96	3,502	71,827	137	2.74	1.34	0.70
111	34	1,464	29,273	72	2.32	1.16	0.47
110	36	944	18,931	52	3.81	1.90	0.69
103	11	351	7,385	15	3.13	1.49	0.73
105	12	333	6,120	18	3.60	1.96	0.67
104	10	306	5,416	15	3.27	1.85	0.67
109	3	150	2,680	7	2.00	1.12	0.43
108	2	118	2,195	8	1.69	0.91	0.25
112	5	105	2,148	6	4.76	2.33	0.83
107	3	88	1,706	5	3.41	1.76	0.60
115	5	88	1,691	7	5.68	2.96	0.71
106	6	85	1,550	4	7.06	3.87	1.50
114	2	54	1,302	6	3.70	1.54	0.33
117	3	52	865	4	5.77	3.47	0.75
118	3	29	510	2	10.34	5.88	1.50
119	1	23	350	2	4.35	2.86	0.50
116	1	15	292	1	6.67	3.42	1.00
113	1	14	198	1	7.14	5.05	1.00

NOTE: The systems in Tables XXIII to XLII are ordered on the basis of decreasing employee size.

TABLE XXIV

ADMINISTRATIVE RATIOS I, II AND III OF TOWN SCHOOL DISTRICTS

System identification number	Administrative component I (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio I (1)x100/(2)	Administrative ratio II (1)x1000/(3)	Administrative ratio III (1)/(4)
232	5	139	2,150	5	3.60	2.33	1.00
231	3	87	1,530	4	3.45	1.96	0.75
230	3	77	1,267	3	3.90	2.37	1.00
204	2	56	944	3	3.57	2.12	0.67
207	1	56	933	3	1.79	1.07	0.33
201	2	34	497	2	5.88	4.02	1.00
217	1	33	538	2	3.03	1.86	0.50
202	2	32	558	2	6.25	3.58	1.00
213	1	32	563	2	3.12	1.78	0.50
205	2	31	598	3	6.45	3.34	0.67
203	2	30	554	2	6.67	3.61	1.00
210	1	30	515	1	3.33	1.94	1.00
208	1	29	575	1	3.45	1.74	1.00
223	3	27	415	1	11.11	7.23	3.00
216	1	24	427	2	4.17	2.34	0.50
214	1	23	396	1	4.35	2.53	1.00
218	1	22	435	1	4.55	2.30	1.00
226	1	20	338	1	5.00	2.96	1.00
229	2	20	336	1	10.00	5.95	2.00
220	1	18	270	1	5.56	3.70	1.00
228	2	18	272	1	11.11	7.35	2.00
206	1	17	250	1	5.88	4.00	1.00
209	1	17	242	2	5.88	4.13	0.50
212	1	17	250	1	5.88	4.00	1.00
222	2	17	250	1	11.76	8.00	2.00
224	1	17	238	1	5.88	4.20	1.00
219	1	16	299	1	6.25	3.34	1.00
227	1	16	282	1	6.25	3.55	1.00
211	2	14	216	1	14.29	9.26	2.00
215	1	14	184	2	7.14	5.43	0.50
225	1	14	237	1	7.14	4.22	1.00
221	1	12	198	1	8.33	5.05	1.00

TABLE XXV

ADMINISTRATIVE RATIOS I, II AND III OF RURAL SCHOOL DISTRICTS

System identification number	Administrative component I (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio I (1)x100/(2)	Administrative ratio II (1)x1000/(3)	Administrative ratio III (1)/(4)
303	1	41	694	2	2.44	1.44	0.50
304	1	38	691	2	2.63	1.45	0.50
301	1	36	687	2	2.78	1.46	0.50
302	2	15	215	1	13.33	9.30	2.00

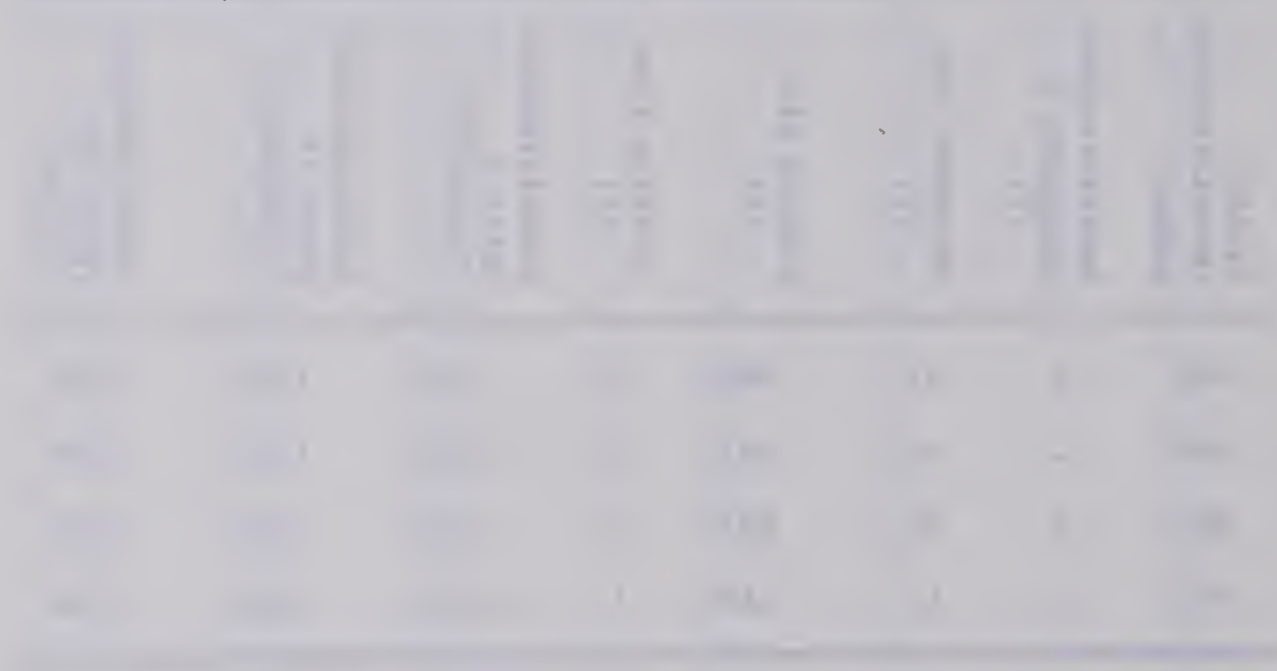


TABLE XXVI

ADMINISTRATIVE RATIOS I, II AND III OF SCHOOL DIVISIONS

System identification number	Administrative component I (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio I (1)x100/(2)	Administrative ratio II (1)x1000/(3)	Administrative ratio III (1)/(4)
416	6	236	3,850	34	2.54	1.56	0.18
404	3	194	3,432	16	1.55	0.87	0.19
412	5	193	3,525	14	2.59	1.42	0.36
423	5	186	3,100	11	2.69	1.61	0.45
410	4	185	3,113	13	2.16	1.28	0.31
417	4	182	3,318	14	2.20	1.21	0.29
426	3	173	3,200	10	1.73	0.94	0.30
424	6	164	2,644	14	3.66	2.27	0.43
425	4	150	2,510	7	2.67	1.59	0.57
403	4	147	2,685	9	2.72	1.49	0.44
405	4	145	2,850	17	2.76	1.40	0.24
420	3	133	2,474	8	2.26	1.21	0.38
407	4	99	1,750	8	4.04	2.29	0.50
413	6	99	2,200	8	6.06	2.73	0.75
406	2	95	1,573	6	2.11	1.27	0.33
418	2	94	1,430	7	2.13	1.40	0.29
411	3	92	1,568	6	3.26	1.91	0.50
408	3	90	1,525	8	3.33	1.97	0.38
409	3	89	1,591	7	3.37	1.89	0.43
401	3	77	1,200	11	3.90	2.50	0.27
414	4	75	900	8	5.33	4.44	0.50
419	2	64	1,097	7	3.12	1.82	0.29
421	2	54	840	8	3.70	2.38	0.25
415	2	50	881	4	4.00	2.27	0.50
422	2	24	318	4	8.33	6.29	0.50
402	2	10	251	2	10.53	7.97	1.00

TABLE XXVII

ADMINISTRATIVE RATIOS I, II AND III OF COUNTY SCHOOL SYSTEMS

System identification number	Administrative component I (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio I (1)x100/(2)	Administrative ratio II (1)x1000/(3)	Administrative ratio III (1)/(4)
520	9	366	6,350	20	2.46	1.42	0.45
516	9	281	4,338	11	3.20	2.07	0.82
510	6	264	4,517	22	2.27	1.33	0.27
512	8	243	4,300	11	3.29	1.86	0.73
508	9	237	3,800	11	3.80	2.37	0.82
515	6	231	3,773	10	2.60	1.59	0.60
511	6	194	3,220	19	3.09	1.86	0.32
507	5	188	3,428	9	2.66	1.46	0.56
523	6	170	2,618	16	3.53	2.29	0.38
506	5	166	2,900	11	3.01	1.72	0.45
504	4	160	2,737	12	2.50	1.46	0.33
501	4	149	2,626	9	2.68	1.52	0.44
526	3	141	2,315	11	2.13	1.30	0.27
503	5	137	2,309	6	3.65	2.17	0.83
525	5	134	2,115	17	3.73	2.36	0.29
502	4	130	2,500	12	3.08	1.60	0.33
524	3	124	1,894	10	2.42	1.58	0.30
527	3	118	1,940	14	2.54	1.55	0.21
513	6	112	1,758	12	5.36	3.41	0.50
509	3	109	1,921	6	2.75	1.56	0.50
517	3	108	1,875	7	2.78	1.60	0.43
505	3	106	1,474	10	2.83	2.04	0.30
522	3	102	1,768	6	2.94	1.70	0.50
521	4	98	1,727	5	4.08	2.32	0.80
518	4	90	1,450	5	4.44	2.76	0.80
514	3	77	1,331	6	3.90	2.25	0.50
519	3	77	1,311	9	3.90	2.29	0.33

TABLE XXVIII

ADMINISTRATIVE RATIOS IV, V AND VI OF CITY SCHOOL DISTRICTS

System identification number	Administrative component II (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio IV (1)x100/(2)	Administrative ratio V (1)x100/(3)	Administrative ratio VI (1)/(4)
102	291	3,519	72,344	181	8.27	4.02	1.61
101	231	3,502	71,827	137	6.65	3.24	1.70
111	106	1,464	29,273	72	7.24	3.62	1.47
110	88	944	18,931	52	9.32	4.64	1.69
103	26	351	7,385	15	7.41	3.52	1.73
105	30	333	6,120	18	9.01	4.90	1.67
104	25	306	5,416	15	8.17	4.62	1.67
109	10	150	2.680	7	6.67	3.73	1.43
108	55	118	2,195	8	4.24	2.28	0.63
112	11	105	2,148	6	10.48	5.12	1.83
107	8	88	1,706	5	9.09	4.60	1.60
115	12	88	1,691	7	13.64	7.10	1.71
106	10	85	1,550	4	11.76	6.45	2.50
114	8	54	1,302	6	14.81	6.14	1.33
117	7	52	865	4	13.46	8.09	1.75
118	5	29	510	2	17.24	9.80	2.50
119	3	23	350	2	13.04	8.57	1.50
116	2	15	292	1	13.33	6.85	2.00
113	2	14	198	1	14.29	10.10	2.00

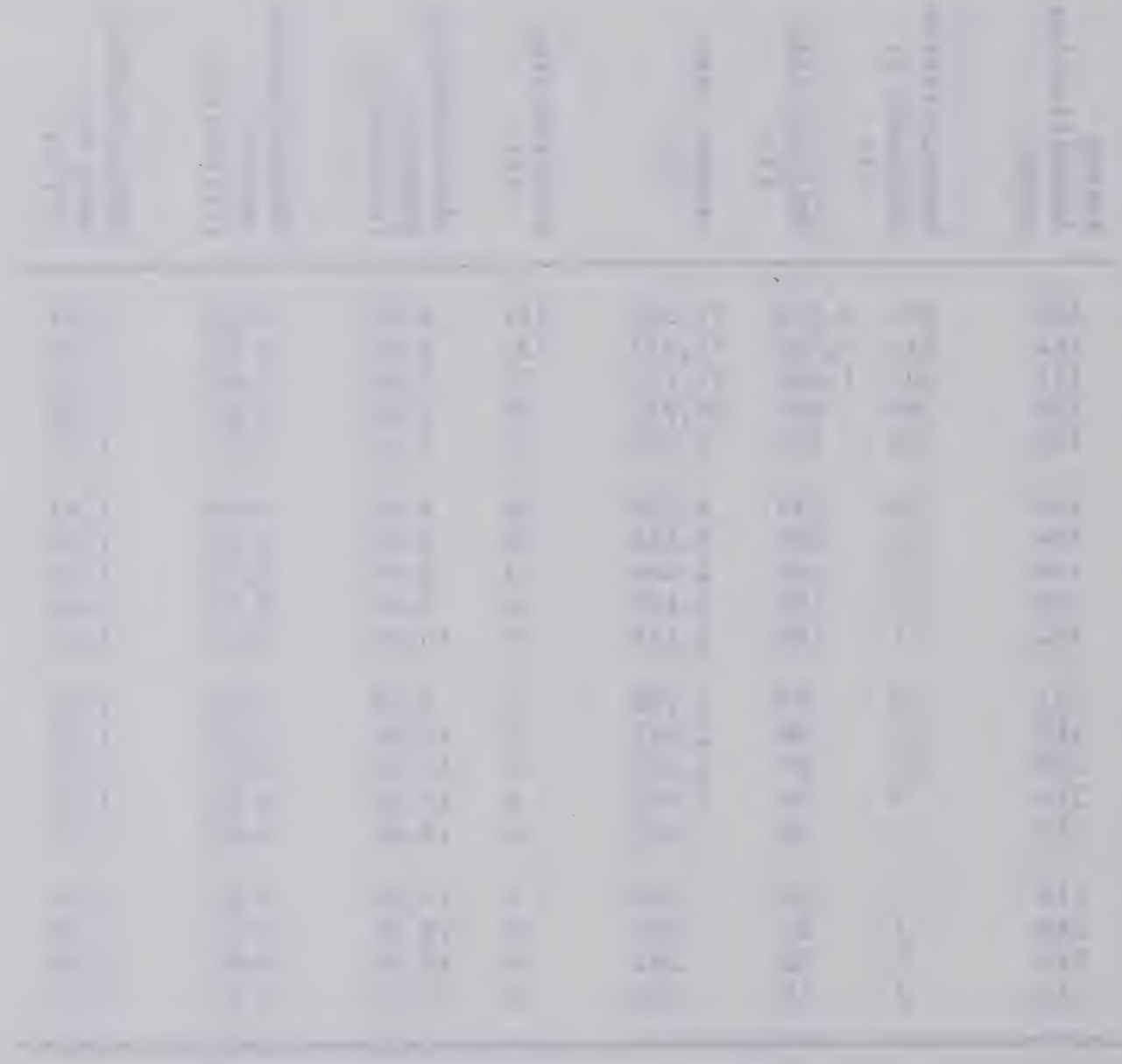


TABLE XXIX

ADMINISTRATIVE RATIOS IV, V AND VI OF TOWN SCHOOL DISTRICTS

System identification number	Administrative component II (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio IV (1)x100/(2)	Administrative ratio V (1)x1000/(3)	Administrative ratio VI (1)/(4)
232	10	139	2,150	5	7.19	4.65	2.00
231	7	87	1,530	4	8.05	4.58	1.75
230	6	77	1,267	3	7.79	4.74	2.00
204	5	56	944	3	8.93	5.30	1.67
207	4	56	933	3	7.14	4.29	1.33
201	4	34	497	2	11.76	8.05	2.00
217	3	33	538	2	9.09	5.58	1.50
202	4	32	558	2	12.50	7.17	2.00
213	3	32	563	2	9.37	5.33	1.50
205	3	31	598	3	9.68	5.02	1.00
203	4	30	554	2	13.33	7.22	2.00
210	2	30	515	1	6.67	3.88	2.00
208	2	29	575	1	6.90	3.48	2.00
223	4	27	415	1	14.81	9.64	4.00
216	3	24	427	2	12.50	7.03	1.50
214	2	23	396	1	8.70	5.05	2.00
218	2	22	435	1	9.09	4.60	2.00
226	2	20	338	1	10.00	5.92	2.00
229	2	20	336	1	15.00	8.93	3.00
220	2	18	270	1	11.11	7.41	2.00
228	3	18	272	1	16.67	11.03	3.00
206	2	17	250	1	11.76	8.00	2.00
209	2	17	242	2	11.76	8.26	1.00
212	2	17	250	1	11.76	8.00	2.00
222	3	17	250	1	17.65	12.00	3.00
224	2	17	238	1	11.76	8.40	2.00
219	2	16	299	1	12.50	6.69	2.00
227	2	16	282	1	12.50	7.09	2.00
211	3	14	216	1	21.43	13.89	3.00
215	2	14	184	2	14.29	10.87	1.00
225	2	14	239	1	14.29	8.44	2.00
221	2	12	198	1	16.67	10.10	2.00

TABLE XXX

ADMINISTRATIVE RATIOS IV, V AND VI OF RURAL SCHOOL DISTRICTS

System identification number	Administrative component II (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio IV (1)x100/(2)	Administrative ratio V (1)x1000/(3)	Administrative ratio VI (1)/(4)
303	3	41	694	2	7.32	4.32	1.50
304	3	38	691	2	7.89	4.34	1.50
301	3	36	687	2	8.33	4.37	1.50
302	3	15	215	1	20.00	13.95	3.00

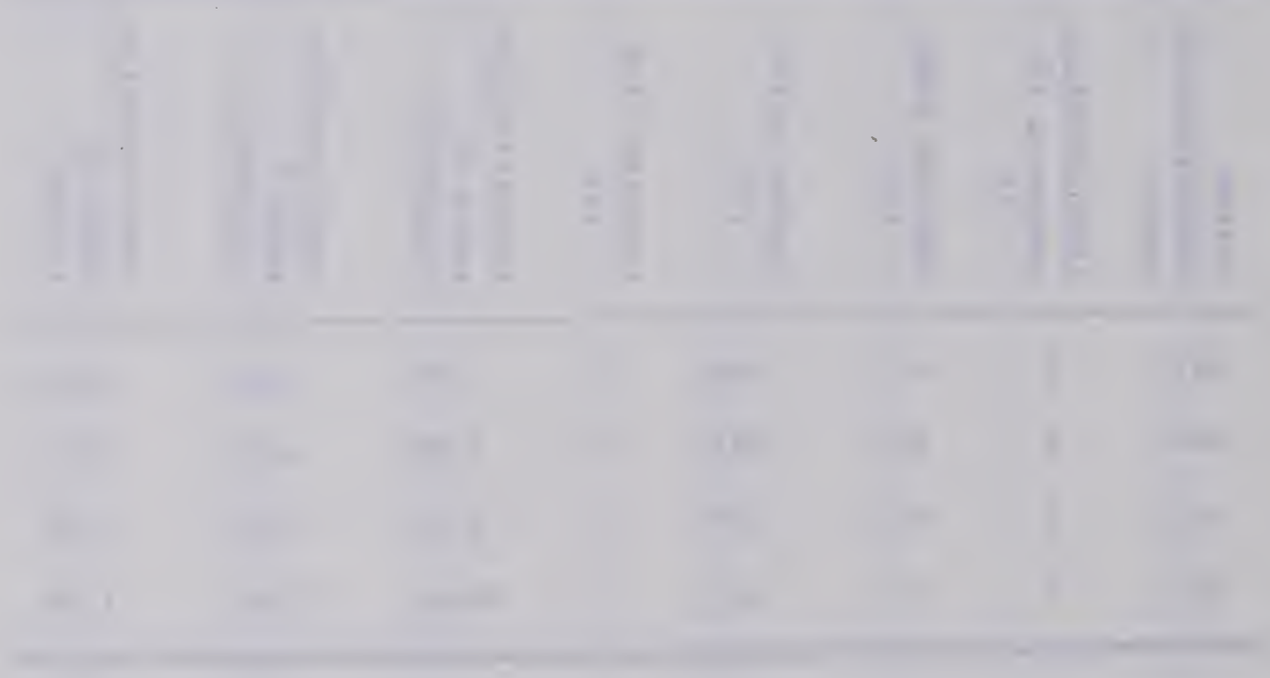


TABLE XXXI

ADMINISTRATIVE RATIOS IV, V AND VI OF SCHOOL DIVISIONS

System identification number	Administrative component II (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio IV (1)x100/(2)	Administrative ratio V (1)x1000/(3)	Administrative ratio VI (1)/(4)
416	40	236	3,850	34	16.95	10.39	1.18
404	16	194	3,432	16	8.25	4.66	1.00
412	19	193	3,525	14	9.94	5.39	1.36
423	16	186	3,100	11	8.60	5.16	1.45
410	15	185	3,113	13	8.11	4.82	1.15
417	18	182	3,318	14	9.89	5.42	1.29
426	10	173	3,200	10	5.78	3.12	1.00
424	20	164	2,644	14	12.20	7.56	1.43
425	11	150	2,510	7	7.33	4.38	1.57
403	13	147	2,685	9	8.84	4.84	1.44
405	12	145	2,850	17	8.28	4.21	0.71
420	10	133	2,474	8	7.52	4.04	1.25
407	11	99	1,750	8	11.11	6.29	1.37
413	14	99	2.200	8	14.14	6.36	1.75
406	9	95	1.573	6	9.47	5.72	1.50
418	5	94	1,430	7	5.32	3.50	0.71
411	9	92	1,568	6	9.78	5.74	1.50
408	10	90	1,525	8	11.11	6.56	1.25
409	10	89	1,591	7	11.24	6.29	1.43
401	11	77	1,200	11	14.29	9.17	1.00
414	12	75	900	8	16.00	13.33	1.50
419	9	64	1,097	7	14.06	8.20	1.29
421	10	54	840	8	18.52	11.90	1.25
415	5	50	881	4	10.00	5.68	1.25
422	5	24	318	4	20.83	15.72	1.25
402	4	10	251	2	21.05	15.94	2.00

TABLE XXXII

ADMINISTRATIVE RATIO IV, V AND VI OF COUNTY SCHOOL SYSTEMS

System identification number	Administrative component II (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio IV (1)x100/(2)	Administrative ratio V (1)x1000/(3)	Administrative ratio VI (1)/(4)
520	29	366	6,350	20	7.92	4.57	1.45
516	19	281	4,338	11	6.76	4.38	1.73
510	27	264	4,517	22	10.23	5.98	1.23
512	19	243	4,300	11	7.82	4.42	1.73
508	20	237	3,800	11	8.44	5.26	1.82
515	16	231	3,773	10	6.93	4.24	1.60
511	19	194	3,220	19	9.79	5.90	1.00
507	14	188	3.428	9	7.45	4.08	1.56
523	22	170	2,618	16	12.94	8.40	1.37
506	16	166	2,900	11	9.64	5.52	1.45
504	16	160	2,737	12	10.00	5.85	1.33
501	12	149	2,626	9	8.05	4.57	1.33
526	14	141	2,315	11	9.93	6.05	1.27
503	11	137	2,309	6	8.03	4.76	1.83
525	15	134	2,115	17	11.19	7.09	0.88
502	16	130	2,500	12	12.31	6.40	1.33
524	12	124	1,894	10	9.68	6.34	1.20
527	12	118	1,940	14	10.17	6.19	0.86
513	15	112	1,758	12	13.39	8.53	1.25
509	9	109	1,921	6	8.26	4.69	1.50
517	10	108	1,875	7	9.26	5.33	1.43
505	10	106	1,474	10	9.43	6.78	1.00
522	9	102	1,768	6	8.82	5.09	1.50
521	9	98	1,727	5	9.18	5.21	1.80
518	9	90	1,450	5	10.00	6.21	1.80
514	7	77	1,331	6	9.09	5.26	1.17
519	11	77	1,311	9	14.29	8.39	1.22

TABLE XXXIII

ADMINISTRATIVE RATIOS VII, VIII AND IX OF CITY SCHOOL DISTRICTS

System identification number	Administrative component III (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio VII (1)x100/(2)	Administrative ratio VIII (1)x1000/(3)	Administrative ratio IX (1)/(4)
102	522	3,519	72,344	181	14.83	7.22	2.88
101	384	3,502	71,827	137	10.97	5.35	2.80
111	175	1,464	29,273	72	11.95	5.98	2.43
110	126	944	18,931	52	13.35	6.66	2.40
103	44	351	7,385	15	12.54	5.96	2.93
105	56	333	6,120	18	16.82	9.15	3.11
104	41	306	5,416	15	13.40	7.57	2.72
109	17	150	2,680	7	11.33	6.34	2.43
108	14	118	2,195	8	11.86	6.38	1.75
112	18	105	2,148	6	17.14	8.38	3.00
107	11	88	1,706	5	12.50	6.45	2.20
115	16	88	1,691	7	18.18	9.46	2.29
106	12	85	1,550	4	14.12	7.74	3.00
114	11	54	1,302	6	20.37	8.45	1.83
117	9	52	865	4	17.31	10.40	2.25
118	6	29	510	2	20.69	11.76	3.00
119	4	23	350	2	17.39	11.43	2.00
116	3	15	292	1	20.00	10.27	3.00
113	3	14	198	1	21.14	15.15	3.00

TABLE XXXIV

ADMINISTRATIVE RATIOS VII, VIII AND IX OF TOWN SCHOOL DISTRICTS

System identification number	Administrative component III (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio VII (1)x100/(2)	Administrative ratio VIII (1)x1000/(3)	Administrative ratio IX (1)/(4)
232	5	139	2,150	5	10.79	6.98	3.00
231	4	87	1,530	4	13.79	7.84	3.00
230	3	77	1,267	3	12.99	7.89	3.33
204	3	56	944	3	14.29	8.47	2.67
207	3	56	933	3	12.50	7.50	2.33
201	2	34	497	2	14.71	10.06	2.50
217	2	33	538	2	12.12	7.43	2.00
202	2	32	558	2	18.75	10.75	3.00
213	2	32	563	2	15.62	8.88	2.50
205	3	31	598	3	12.90	6.69	1.33
203	2	30	554	2	20.00	10.83	3.00
210	1	30	515	1	13.33	7.77	4.00
208	1	29	575	1	10.34	5.22	3.00
223	1	27	415	1	22.22	14.46	6.00
216	2	24	427	2	16.67	9.37	2.00
214	1	23	396	1	17.39	10.10	4.00
218	1	22	435	1	13.64	6.90	3.00
226	1	20	338	1	15.00	8.88	3.00
229	1	20	336	1	20.00	11.90	4.00
220	1	18	270	1	16.67	11.11	3.00
228	1	18	272	1	22.22	14.71	4.00
206	1	17	250	1	17.65	12.00	3.00
209	2	17	242	2	23.53	16.53	2.00
212	1	17	250	1	23.53	16.00	4.00
222	1	17	250	1	23.53	16.00	4.00
224	1	17	238	1	17.65	12.61	3.00
219	1	16	299	1	18.75	10.03	3.00
227	1	16	282	1	18.75	10.64	3.00
211	1	14	216	1	21.43	13.89	3.00
215	2	14	184	2	21.43	16.30	1.50
225	1	14	237	1	21.43	12.66	3.00
221	1	12	198	1	16.67	10.10	2.00

TABLE XXXV

ADMINISTRATIVE RATIOS VII, VIII AND IX OF RURAL SCHOOL DISTRICTS

System identification number	Administrative component III (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio VII (1)x100/(2)	Administrative ratio VIII (1)x1000/(3)	Administrative ratio IX (1)/(4)
303	5	41	694	2	12.20	7.20	2.50
304	5	38	691	2	13.16	7.24	2.50
301	5	36	687	2	13.89	7.28	2.50
302	5	15	215	1	33.33	23.26	5.00

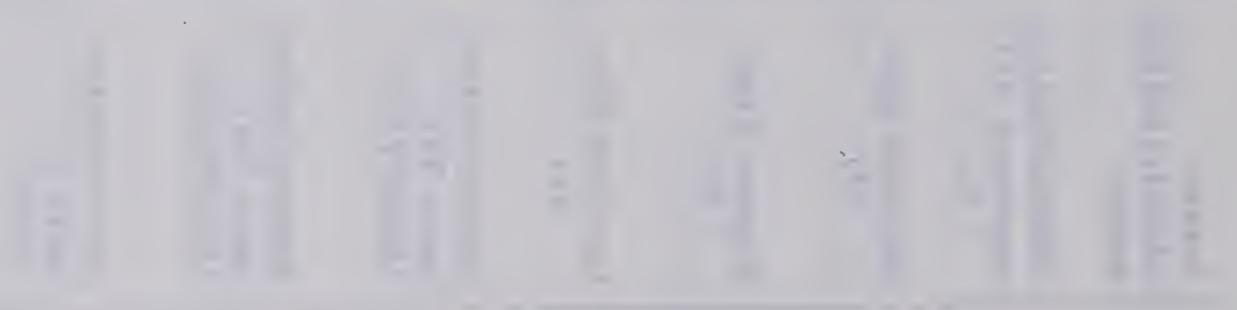


TABLE XXXVI

ADMINISTRATIVE RATIOS VII, VIII AND IX OF SCHOOL DIVISIONS

System identification number	Administrative component III (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio VII (1)x100/(2)	Administrative ratio VIII (1)x1000/(3)	Administrative ratio IX (1)/(4)
416	47	236	3,850	34	19.92	12.21	1.38
404	25	194	3,432	16	12.89	7.28	1.56
412	30	193	3,525	14	15.54	8.51	2.14
423	25	186	3,100	11	13.44	8.06	2.27
410	26	185	3,113	13	14.05	8.35	2.00
417	27	182	3,318	14	14.84	8.14	1.93
426	20	173	3,200	10	11.56	6.25	2.00
424	28	164	2,644	14	17.07	10.59	2.00
425	20	150	2,510	7	13.33	7.97	2.86
403	21	147	2,685	9	14.29	7.82	2.33
405	20	145	2,850	17	13.79	7.02	1.18
420	17	133	2,474	8	12.78	6.87	2.12
407	14	99	1,750	8	14.14	8.00	1.75
413	19	99	2,200	8	19.19	8.64	2.37
406	12	95	1,573	6	12.63	7.63	2.00
418	10	94	1,430	7	10.64	6.99	1.43
411	14	92	1,568	6	15.22	8.93	2.33
408	14	90	1,525	8	15.56	9.18	1.75
409	17	89	1,591	7	19.10	10.69	2.43
401	16	77	1,200	11	20.78	13.33	1.45
414	15	75	900	8	20.00	16.67	1.87
419	11	64	1,097	7	17.19	10.03	1.57
421	12	54	840	8	22.22	14.29	1.50
415	8	50	881	4	16.00	9.08	2.00
422	6	24	318	4	25.00	18.87	1.50
402	5	10	251	2	26.32	19.92	2.50

TABLE XXXVII

ADMINISTRATIVE RATIOS VII, VIII AND IX OF COUNTY SCHOOL SYSTEMS

System identification number	Administrative component III (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio VII (1)x100/(2)	Administrative ratio VIII (1)x1000/(3)	Administrative ratio IX (1)/(4)
520	48	366	6,350	20	13.11	7.56	2.40
516	36	281	4,338	11	12.81	8.30	3.27
510	42	264	4,517	22	15.91	9.30	1.91
512	27	243	4,300	11	11.11	6.28	2.45
508	34	237	3,800	11	14.35	8.95	3.09
515	27	231	3,773	10	11.69	7.16	2.70
511	26	194	3,220	19	13.40	8.07	1.37
507	21	188	3,428	9	11.17	6.13	2.33
523	30	170	2,618	16	17.65	11.46	1.87
506	24	166	2,900	11	14.46	8.28	2.18
504	24	160	2,737	12	15.00	8.77	2.00
501	19	149	2,626	9	12.75	7.24	2.11
526	22	141	2,314	11	15.60	9.51	2.00
503	16	137	2,309	6	11.68	6.93	2.67
525	21	134	2,115	17	15.67	9.93	1.24
502	19	130	2,500	12	14.62	7.60	1.58
524	19	124	1,894	10	15.32	10.03	1.90
527	18	118	1,940	14	15.25	9.28	1.29
513	22	112	1,758	12	19.64	12.51	1.83
509	16	109	1,921	6	14.68	8.33	2.67
517	16	108	1,875	7	14.81	8.53	2.29
505	16	106	1,474	10	15.09	10.85	1.60
522	15	102	1,768	6	14.71	8.48	2.50
521	14	98	1,727	5	14.29	8.11	2.80
518	13	90	1,450	5	14.44	8.97	2.60
514	11	77	1,331	6	14.29	8.26	1.83
519	15	77	1,311	9	19.48	11.44	1.67

TABLE XXXVIII

ADMINISTRATIVE RATIOS X, XI AND XII OF CITY SCHOOL DISTRICTS

System identification number	Administrative component IV (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio X (1)x100/(2)	Administrative ratio XI (1)x1000/(3)	Administrative ratio XII (1)/(4)
102	567	3,519	72,344	181	16.11	7.84	3.13
101	418	3,502	71,827	137	11.94	5.82	3.05
111	183	1,464	29,273	72	12.50	6.25	2.54
110	140	944	18,931	52	14.83	7.40	2.69
103	45	351	7,385	15	12.82	6.09	3.00
105	49	333	6,120	18	14.71	8.01	2.72
104	43	306	5,416	15	14.05	7.94	2.87
109	17	150	2,680	7	11.33	6.34	2.43
108	15	118	2,195	8	12.71	6.83	1.87
112	18	105	2,148	6	17.14	8.38	3.00
107	11	88	1,706	5	12.50	6.45	2.20
115	16	88	1,691	7	18.18	9.46	2.29
106	12	85	1,550	4	14.12	7.74	3.00
114	11	54	1,302	6	20.37	8.45	1.83
117	9	52	865	4	17.31	10.40	2.25
118	6	29	510	2	20.69	11.76	3.00
119	4	23	350	2	17.39	11.43	2.00
116	3	15	292	1	20.00	10.27	3.00
113	3	14	198	1	21.43	15.15	3.00

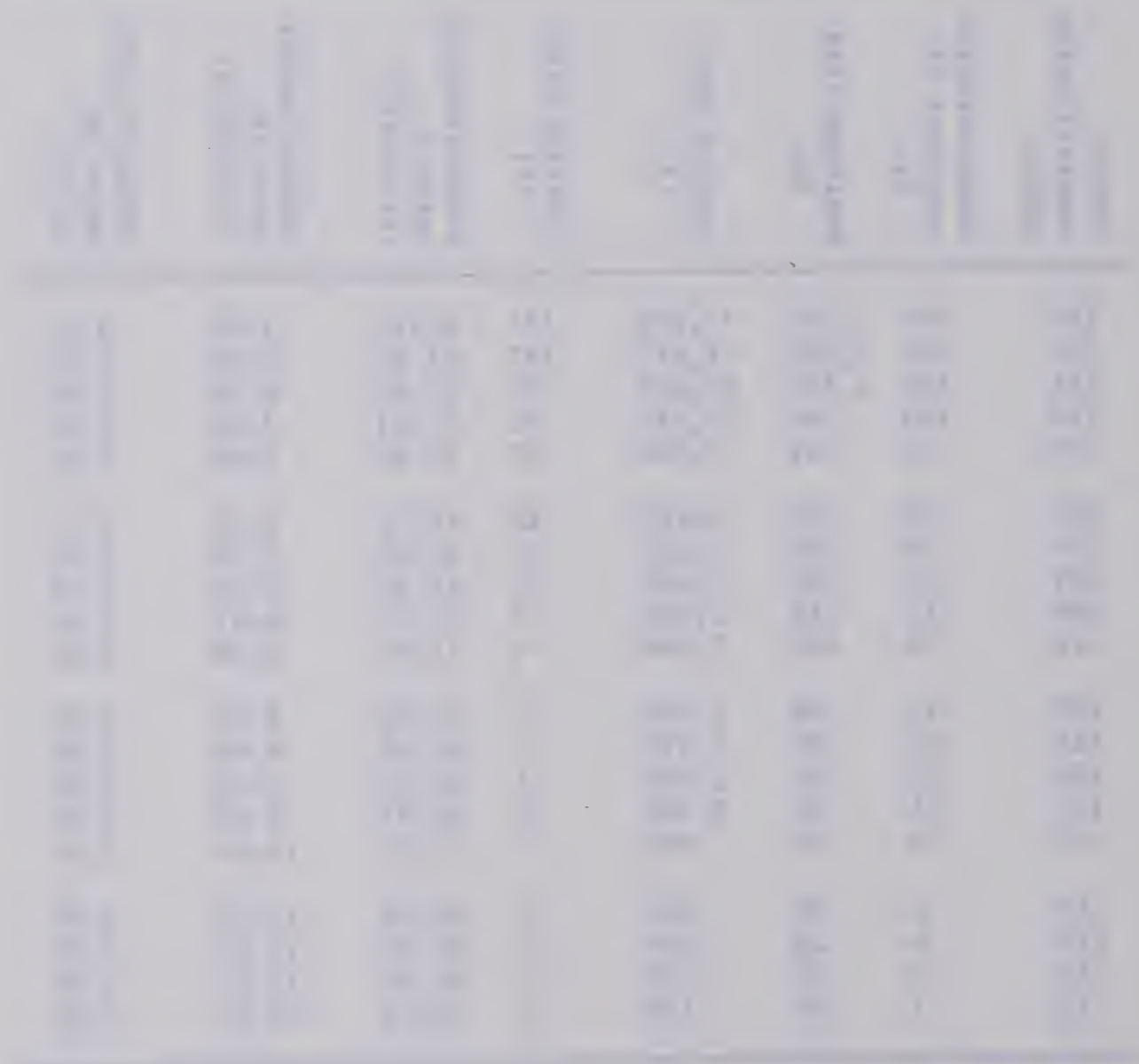


TABLE XXXIX

ADMINISTRATIVE RATIOS X, XI AND XII OF TOWN SCHOOL DISTRICTS

System identification number	Administrative component IV (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio X (1)x100/(2)	Administrative ratio XI (1)x1000/(3)	Administrative ratio XII (1)/(4)
232	15	139	2,150	5	10.79	6.98	3.00
231	17	87	1,530	4	19.54	11.11	4.25
230	11	77	1,267	3	14.29	8.68	3.67
204	9	56	944	3	16.07	9.53	3.00
207	7	56	933	3	12.50	7.50	2.33
201	6	34	497	2	17.65	12.07	3.00
217	5	33	538	2	15.15	9.29	2.50
202	6	32	558	2	18.75	10.75	3.00
213	5	32	563	2	15.62	8.88	2.50
205	4	31	598	3	12.90	6.69	1.33
203	6	30	554	2	20.00	10.83	3.00
210	4	30	515	1	13.33	7.77	4.00
208	3	29	575	1	10.34	5.22	3.00
223	6	27	415	1	22.22	14.46	6.00
216	4	24	427	2	16.67	9.37	2.00
214	4	23	396	1	17.39	10.10	4.00
218	5	22	435	1	22.73	11.49	5.00
226	3	20	338	1	15.00	8.88	3.00
229	4	20	336	1	20.00	11.90	4.00
220	3	18	270	1	16.67	11.11	3.00
228	4	18	272	1	22.22	14.71	4.00
206	3	17	250	1	17.65	12.00	3.00
209	4	17	242	2	23.53	16.53	2.00
212	4	17	250	1	23.53	16.00	4.00
222	4	17	250	1	23.53	16.00	4.00
224	3	17	238	1	17.65	12.61	3.00
219	3	16	299	1	18.75	10.03	3.00
227	3	16	282	1	18.75	10.64	3.00
211	3	14	216	1	21.43	13.89	3.00
215	3	14	184	2	21.43	16.30	1.50
225	3	14	237	1	21.43	12.66	3.00
221	2	12	198	1	16.67	10.10	2.00

TABLE XL

ADMINISTRATIVE RATIOS X, XI AND XII OF RURAL SCHOOL DISTRICTS

System identification number	Administrative component IV (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio X (1)x100/(2)	Administrative ratio XI (1)x1000/(3)	Administrative ratio XII (1)/(4)
303	5	41	694	2	12.20	7.20	2.50
304	5	38	691	2	13.16	7.24	2.50
301	5	36	687	2	13.89	7.28	2.50
302	5	15	215	1	33.33	23.26	5.00

TABLE XLI

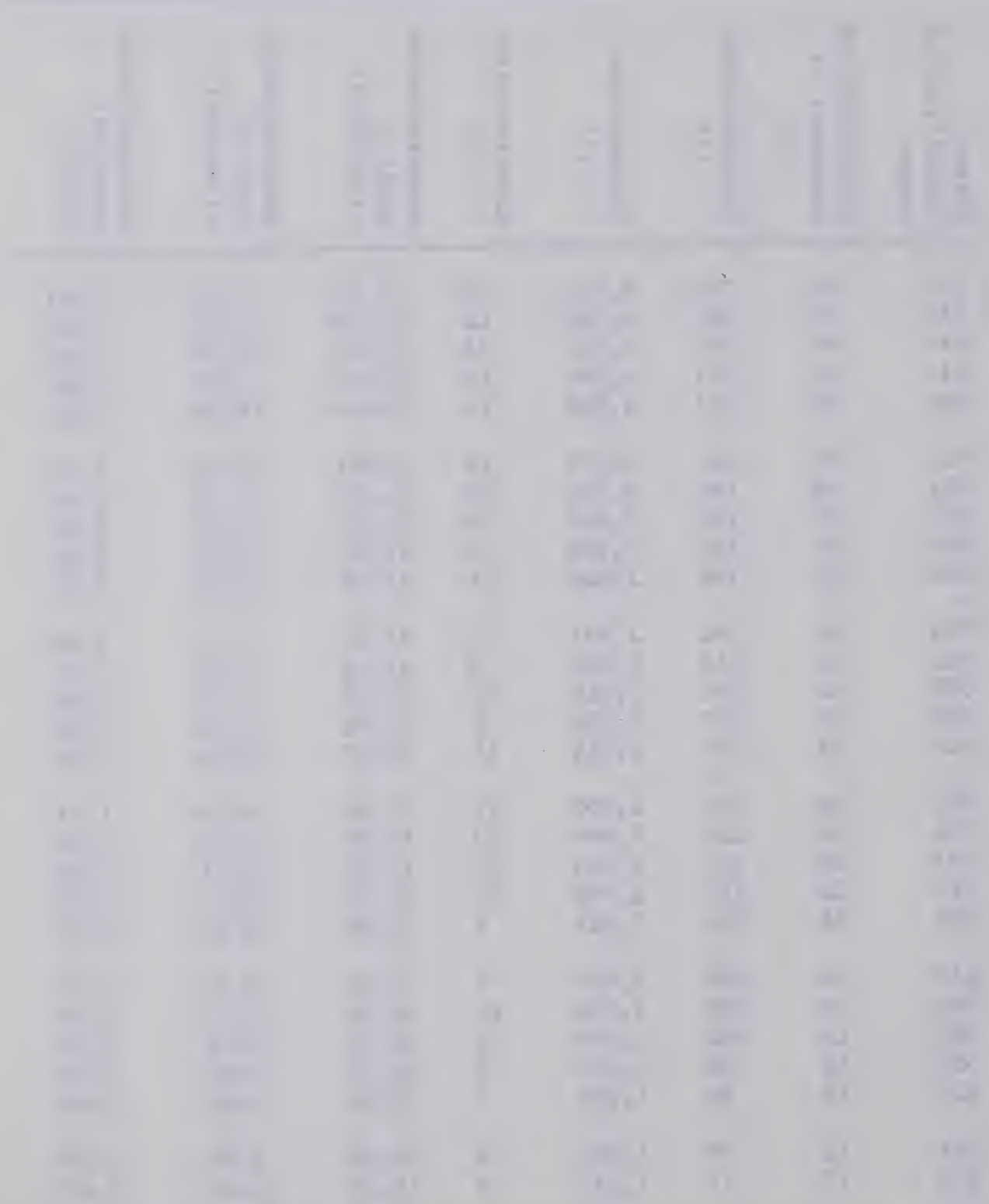
ADMINISTRATIVE RATIOS X, XI AND XII OF SCHOOL DIVISIONS

System identification number	Administrative component IV (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio X (1)x100/(2)	Administrative ratio XI (1)x1000/(3)	Administrative ratio XII (1)/(4)
416	49	236	3,850	34	20.76	12.73	1.44
404	27	194	3,432	16	13.92	7.87	1.69
412	32	193	3,525	14	16.58	9.08	2.29
423	26	186	3,100	11	13.98	8.39	2.36
410	27	185	3,113	13	14.59	8.67	2.08
417	28	182	3,318	14	15.38	8.44	2.00
426	21	173	3,200	10	12.14	6.56	2.10
424	31	164	2,644	14	18.90	11.72	2.21
425	20	150	2,510	7	13.33	7.97	2.86
403	21	147	2,685	9	14.29	7.82	2.33
405	21	145	2,850	17	14.48	7.37	1.24
420	17	133	2,474	8	12.78	6.87	2.12
407	15	99	1,750	8	15.15	8.57	1.87
413	19	99	2,200	8	19.19	8.64	2.37
406	12	95	1,573	6	12.63	7.63	2.00
418	13	94	1,430	7	13.83	9.09	1.86
411	15	92	1,568	6	16.30	9.57	2.50
408	15	90	1,525	8	16.67	9.84	1.87
409	17	89	1,591	7	19.10	10.69	2.43
401	16	77	1,200	11	20.78	13.33	1.45
414	17	75	900	8	22.67	18.89	2.12
419	11	64	1,097	7	17.19	10.03	1.57
421	13	54	840	8	24.07	15.48	1.62
415	8	50	881	4	16.00	9.08	2.00
422	7	24	318	4	29.17	22.01	1.75
402	5	19	251	2	26.32	19.92	2.50

TABLE XLII

ADMINISTRATIVE RATIOS X, XI AND XII OF COUNTY SCHOOL SYSTEMS

System identification number	Administrative component IV (1)	Employee size (2)	Student size (3)	Location size (4)	Administrative ratio X (1)x100/(2)	Administrative ratio XI (1)x1000/(3)	Administrative ratio XII (1)/(4)
520	56	366	6,350	20	15.30	8.82	2.80
516	43	281	4,338	11	15.30	9.91	3.91
510	46	264	4,517	22	17.42	10.18	2.09
512	33	243	4,300	11	13.58	7.67	3.00
508	39	237	3,800	11	16.46	10.26	3.55
515	32	231	3,773	10	13.85	8.48	3.20
511	28	194	3,220	19	14.43	8.70	1.47
507	22	188	3,428	9	11.70	6.42	2.44
523	33	170	2,618	16	19.41	12.61	2.06
506	25	166	2,900	11	15.06	8.62	2.27
504	25	160	2,737	12	15.62	9.13	2.08
501	19	149	2,626	9	12.75	7.24	2.11
526	22	141	2,314	11	15.60	9.51	2.00
503	17	137	2,309	6	12.41	7.36	2.83
525	22	134	2,115	17	16.42	10.40	1.29
502	20	130	2,500	12	15.38	8.00	1.67
524	21	124	1,894	10	16.94	11.09	2.10
527	20	118	1,940	14	16.95	10.31	1.43
513	22	112	1,758	12	19.64	12.51	1.83
509	16	109	1,921	6	14.68	8.33	2.67
517	16	108	1,875	7	14.81	8.53	2.29
505	24	106	1,474	10	22.64	16.28	2.40
522	15	102	1,768	6	14.71	8.48	2.50
521	15	98	1,727	5	15.31	8.69	3.00
518	14	90	1,450	5	15.56	9.66	2.80
514	11	77	1,331	6	14.29	8.26	1.83
519	15	77	1,311	9	19.48	11.44	1.67



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